

THE IRON AGE

Established 1855

New York, October 29, 1914

Vol. 94 : No. 18

The Evolution of the Car Dumper

Several New Types of Machines for Unloading Coal Built on Lake Erie Docks Providing Increase in Speed

Substitution of Electricity for Steam as Motive Power, Changes in Form of Tower and Scheme of Operation



WITH recent additions to the ore handling facilities at Lake Erie ports, the docks are well supplied with equipment, for the most part of the latest type and sufficient to handle easily more ore than was brought down from the Lake Superior mines during the record breaking season of 1913, and the attention of the railroads having termini at these ports has been turned to providing more adequate equipment for the quick and economical handling of coal shipped by rail from the Ohio and West Virginia and western Pennsylvania mines and transferred at the Lake ports to boats for shipment up the Lakes. During the past few months four car dumping plants for coal handling have been erected at Lake Erie ports in Ohio, these being of three different types designed by the three Cleveland companies that engage in the building of this class of equipment. Each car dumper has a number of improvements along somewhat similar lines as compared with those previously installed, the general efforts of the builders being to provide speedier machines and ones capable of handling cars of a larger capacity. In two of the plants electricity has been substituted for steam for some of the operations. Heretofore steam has been used exclusively for

power in connection with the dumpers on the Lake docks.

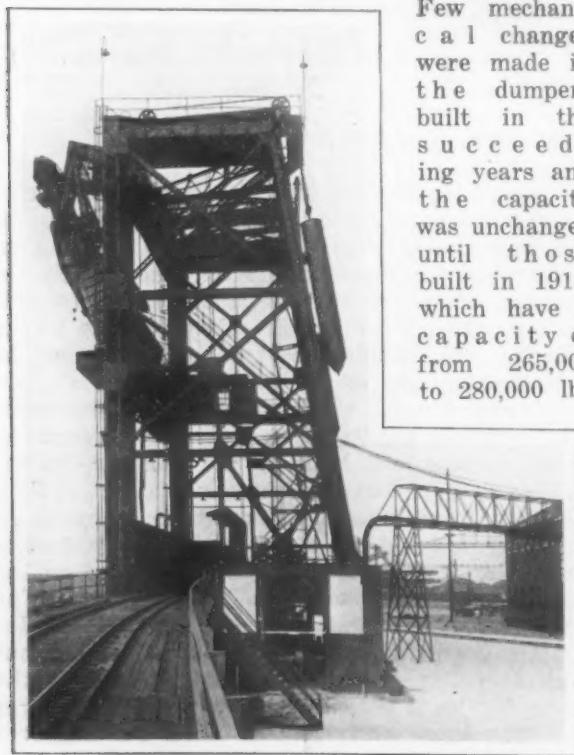
One of the new car dumping plants was erected by the Brown Hoisting Machinery Company for the Hocking Valley railroad at Toledo. This plant consists of two machines. While the capacity of one dumper is sufficient to handle the coal transshipped by that railroad at this point, the second machine was installed so that no delay would be caused should one of the dumpers be out of commission and quick dispatch of boats with their cargoes would always be assured. The second car dumping plant was built by the Wellman-Seaver-Morgan Company on the Pennsylvania dock at Sandusky for handling coal shipments made by M. A. Hanna & Co., and the same builder has just completed the erection of a duplicate machine on the Pennsylvania Railroad docks at Cleveland. The fourth car dumper was erected by the McMyler-Interstate Company for the Pittsburgh & Conneaut Dock Company at Conneaut, Ohio. Each of the new machines is not only designed to handle larger cars than those previously installed, but has over 30 per cent. greater speed, being capable of handling 40 cars per hr. as compared with 30 cars which was the maximum hourly capacity of the

plants previously built. The new plants are designed to handle the largest coal cars now in service, the new Norfolk & Western cars with a capacity of 90 tons of soft coal and the proposed larger cars with 100 tons capacity. With the speed at which the plants are operated, coal is dumped from the cars directly into the Lake boats at the rate of 60 tons per min. or 3600 tons per hr. for each dumper.

The development of the car dumper for unloading coal dates from 1891 when the first practical machine for this purpose was built for the Lake Shore railroad at Ashtabula, Ohio, this machine being of the end dumping type. Later a similar machine was installed by the Baltimore & Ohio Railroad at Fairport, Ohio. The principal objection to this dumper was that special cars were required for the reason that one end of the car had to be movable so that it could be raised up to allow the coal to flow out. To overcome this objection the construction of the dumper was changed and a side dumping machine was brought out. Several dumpers of this design were erected at Lake Erie ports for handling cars with a capacity of 18 tons, or a total weight of 80,000 lb., including the car and the load. The next step was the building of a rolling type of dumper, the cars being put in a cylinder and rolled over. Later a modified rolling machine was built, this being followed by another type of rolling dumper designed to handle two cars at once. A machine of this type is still being used by the Bethlehem Steel Company. In another of the earlier types of dumpers the cars were dumped into tubs and these were emptied into the boats.

In 1900 the leading builders settled on the side type of dumper and increased their size and strength so that they could handle longer and higher cars, their total capacity being increased from 180,000 to 224,000 lb. There are in operation about 50 dumpers of this type, about 20 of these being at Lake Erie ports for handling coal and the remainder being at Eastern ports for handling coal and at some of the blast furnaces for unloading ore.

Few mechanical changes were made in the dumpers built in the succeeding years and the capacity was unchanged until those built in 1914, which have a capacity of from 265,000 to 280,000 lb.,



A Car Dumping Plant Operated Partly by Steam Power and Partly by Electricity. The Pipe Supplying the Steam is Carried on the Trestle at the Right.



A Machine in Which Electricity Has Been Substituted for Steam in the Operation of the Spout. Here the Coal Is Wet Down from a Side Tank

including the car and its load. The new machines were erected to replace old dumpers that were incapable of handling cars of the present size and capacity.

In brief the general operation of a car dumper is as follows: The loaded car is pushed by a cable-propelled haulage car on an inclined track to the cradle of the machine. It is raised about 30 ft. by the cradle, clamped automatically and turned over, the coal being dumped into a pan that leads to a spout or telescope which discharges the fuel into the boat. The usual equipment is a main hoisting engine, a haulage car operating engine, a pan engine and an engine located on the pan for operating the spout that is used for trimming the coal, or properly distributing it, while it is being discharged through the spout into the boat. The pan engine raises the pan that is hung on hinges on a pan girder, this girder being raised and lowered between the front columns by two large vertical screws that are turned by a train of gearing at the lower end. The pan engine also raises and lowers the lower end of the pan by cables.

One of the most important features of the new type of unloader is that the cradle in which the car is lifted is counterweighted with two weights, each of 45 to 50 tons. These counterweights are about the weight of the cradle itself so that there is less work for the hoisting engine. Speed has been increased by providing larger engines and by having faster operating haulage cars. These improvements make it possible to cover the complete cycle in unloading a car in less than 2 min. and an hourly unloading speed of 47 cars has been developed.

The Conneaut plant erected by the McMyler-Interstate Company is operated in part by steam and in part by electricity. The two large units that haul the car into the machine and dump it are operated by steam. Electrical power is used for the smaller units that operate the trimmer and telescope and raise and lower the outer and inner ends of the pan. The power, both steam and electric, is taken from the main plant of the dock, the steam pipe leading to the machine being car-

ried on a steel trestle as shown in the photograph of this machine. All operations of the pan, telescope and trimmer are performed by the man on the end of the pan over the telescope. By electrical power he raises and lowers the inner and outer ends of the pan, swings the telescope and operates the trimmer. The new arrangement permits the man over the telescope to deliver the coal just where he wants it without signaling to the man in the operator's house. The controllers for moving both ends of the pan are operated by two masters, one on the end of the pan and one in the operator's house on the end of the dumper, so that when it is desired to raise the pan out of the way of passing vessels the operator leaves the pan and the man in the operator's house on the end of the dumper raises it. This method of moving the pan from the end is a feature that had not been installed in any previous machine.

Another new feature of the Conneaut dumper is the disappearing haulage car. By this arrangement the haulage car passes under the loaded car and comes up in the rear of it. The haulage car is made to run in a pit between the rails of the approach track and has an arm which is pivoted to the car and balanced by a counterweight. A friction is provided on the rear axle of the car so that when it moves backward the arm lies below the level of the approach track rail. Whenever the car moves forward the friction acts in the other direction and raises the end of the arm to engage the coupler of the car.

In the Hocking Valley plant built by the Brown Hoisting Machinery Company, electricity has been substituted for steam power in operating the spout. An important advantage claimed for using electricity for operating the equipment at the discharge end of the unloader is that the vision of the operator is not obstructed by the exhaust steam from a trimming engine located on the pan. Power for the Hocking Valley plant is furnished from a power house located a short distance from the unloaders, steam and electricity being carried to the machines in conduits. The boiler house and power house for this plant are combined in a separate brick building located on the dock between the car dumping machines. It is a very complete power station. The boilers are equipped with stokers, coal and ash handling equipment and electric cranes, and a small machine shop is provided for maintenance purposes.

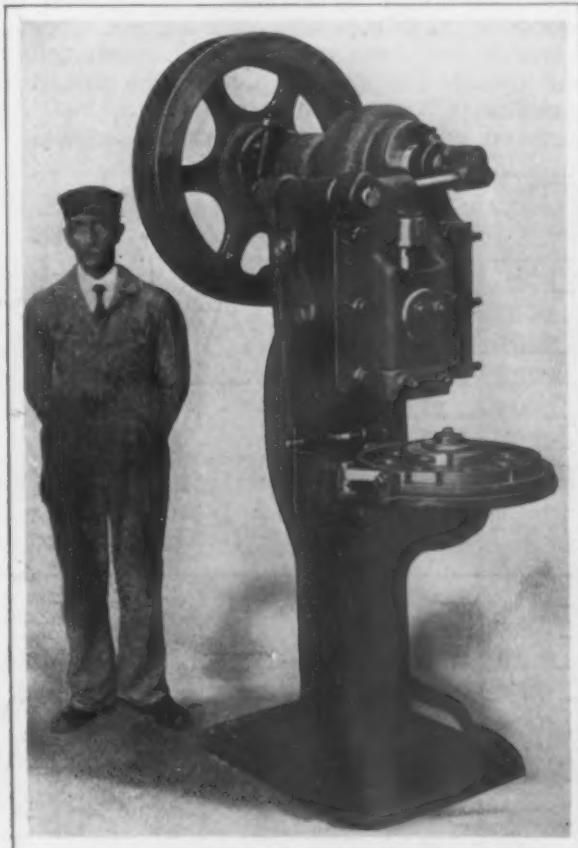
An important safety feature in connection with this plant is that the sprinkling tank for wetting down the coal before dumping instead of being located over the track is set up at one side of the track after the manner of a locomotive watering tank, thus leaving an unobstructed view of the haulage car for the operator stationed on the frame of the machine.

The two machines built by the Wellman-Seaver-Morgan Company, at Sandusky and Cleveland, are different from others in the shape of their frames, a rectangular frame having been adopted, presumably more from the standpoint of neat appearance than for mechanical reasons. The haulage car arrangement is also new, a reversing engine with a tail rope being used to give high speed in returning the haulage car after placing a loaded coal car in the cradle. The arrangement of ropes has been much simplified, a smaller number of ropes and larger sizes being used. The counterweight for these machines is a simple arrangement introduced into the cradle hoisting system in such a manner that it lifts one-third of the entire weight of the car and contents automatically.

New Dial Feed Attachment for Presses

An improved dial feed attachment has been developed by the Ferracute Machine Company, Bridgeport, N. J. In it the mechanism that imparts intermittent motion to the circular dial plate has been made quite heavy. The attachment, it is emphasized, enables every stroke of the press to be utilized. It is also a safety device, as well as a time saver, since the operator's hands are kept at a distance from the dies when he places the shells or blanks in the recesses of the dial as it revolves.

In the accompanying illustration, the attachment forms a part of a punching press, exerting a ram pressure of 25 tons. As the front end of the press shaft revolves it imparts motion to a bell crank



An Improved Form of Dial Feed Attachment That Has Been Recently Developed

lever. A horizontal pitman connects the lower end of this lever to the yoke surrounding the dial, and in this way the yoke receives a reciprocating motion. The dial is moved by a pawl attached to the yoke and the rotary motion is regulated by a spring lock, having a screw adjustment for the tension of the spring. The brake at the center of the dial is adjustable and longitudinal adjustment is provided for the pitman, which contains a universal joint at each end.

The Wagner Electric Company, St. Louis, has inaugurated the policy of requiring all its apprentices to attend the St. Louis public night schools where the instruction course includes all the trades. They must attend the schools at least twice each week and on certification of the completion of a year's attendance their wages will be increased. The scale announced for graduates is 20 to 24c. per hour for motor winding; 18 to 24c. for drill press work; 22 to 28c. for milling machine work and 24 to 28c. for lathe work. The company will also inaugurate five short term apprentice courses which will not interfere with their regular three-year apprenticeship course. The regular apprentices are also sent to the Ranken Mechanical Trades School for two years for two half days each week.

Railroad Buying and National Prosperity

The Interstate Commerce Commission Is Bound to Stimulate Business Activity in View of Powers Conferred in 1908

BY E. B. LEIGH*

Railroad rates, general prosperity and the function of the Interstate Commerce Commission in connection therewith were the subjects of comment by the commission in its decision of July 29, 1914, dealing with the 5 per cent. advance case.

The commission held: "The law did not confer upon us power to aid general prosperity." A propaganda, of which the commission disapproved, had proceeded "as if the commission had the legislative power in that form to stimulate business activity and promote the public welfare." The commission concluded: "We have no authority to approve rate increases with a view to stimulating business."

ing power to the commission, that body was logically and inevitably vested with the responsibility of that which would naturally flow from its exercise of such sweeping powers; and not only in its effect upon the railroads themselves, but upon all collateral as well as general business interests.

CONGRESS DELEGATED LARGE POWERS

Congress is unquestionably charged with promoting the general welfare.

The general railroad problem has been committed by Congress to the Interstate Commerce Commission. Whatever the precise terms of the

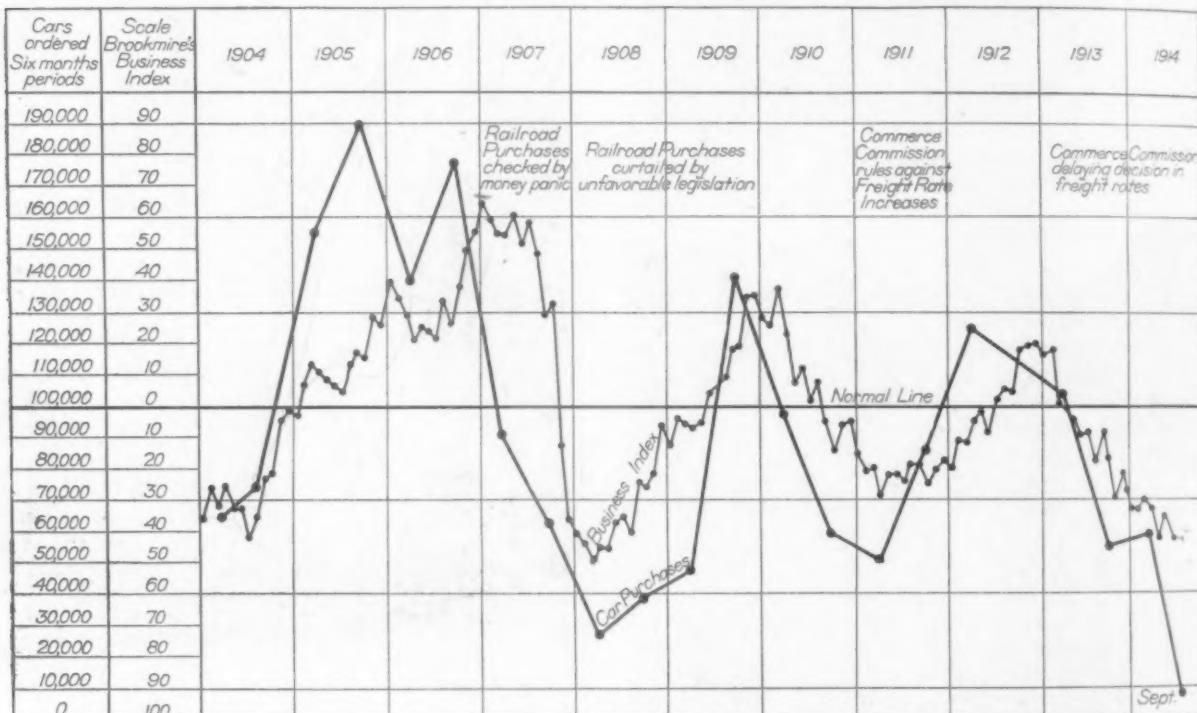


Diagram Showing Relation of Railroad Purchases to General Business Conditions

THE COMMISSION'S RESPONSIBILITY

It is manifestly of the utmost importance that somewhere in our government responsibility shall lie for that specific promotion of the general welfare which consists of protecting the railroads against influences, governmental and otherwise, which tend to impoverish the roads and with them the whole people.

If the Interstate Commerce Commission does not perform that function who will?

It is undoubtedly true that, as originally organized, the functions of the Interstate Commerce Commission were largely confined to an administrative or semi-judicial consideration of complaints and alleged abuses, specifically referred to them for adjudication. Under these conditions the decisions and orders of the commission did not broadly affect the railroads' prosperity or the general business of the country.

But with the enlargement of its powers, and particularly when Congress delegated the rate-mak-

law, the commission clearly has the responsibility.

The decisions of the Supreme Court in the Shreveport case and the Inter-Mountain rate case seem to suggest clearly not only this responsibility, but the broad inherent powers of the Commission and the consequent necessity of its wise and prudent exercise of such authority.

As now constituted, with the broad scope and power delegated to it by Congress, as suggested and virtually defined by the Supreme Court, is not the Interstate Commerce Commission to-day more of a legislative than a judicial body? It would seem that the fundamental purpose of the creation of the Interstate Commerce Commission, with its enormous, delegated power, must be that of conserving the good of the people as a whole and not merely that of partisan or isolated interests.

Certain it is that the commission, by virtue of its authority and control, is charged with the responsibility of the preservation and prosperity of the railroads, at least in so far as the exercise of such authority and control is essential to their maintenance and prosperity.

*President Chicago Railway Equipment Company.

As railroad prosperity affects general prosperity, or the people as a whole, to just that extent is the commission responsible for such general prosperity.

It is well known that the wonderful expansion and development of this country have been due primarily to the railroads. Possibly all the people do not realize that the railroads constitute the great arterial system of our country. If the arterial system is sound and strong, then the entire body is strong; if impaired, the body is weakened. The great centers of population are dependent upon the railroads for their daily existence.

Not only have the railroads developed the agricultural, mining, manufacturing and commercial activities of this country; but because of their enormous requirements for the maintenance and extension of their own properties, have become the most potent single contributing factor to general business prosperity.

AN OBLIGATION TO AID PROSPERITY

The commission held: "The law did not confer upon us power to aid general prosperity." It can hardly be claimed that the law conferred upon it the power or right of impairing or retarding general prosperity. If it gave the commission the power of legislating upon that which virtually affects general prosperity, may we not assume that the law (surely intended for good, and not evil) did confer upon the commission not only the power but the obligation of aiding prosperity?

Its now defined scope and authority make the commission the possible controlling factor not only in the measure of prosperity of the railroads but of the whole people. The commission is thus invested with the greatest power for the possible confiscation of private property the world has ever seen.

On the other hand, this authority carries with it the ability of the commission to be the greatest conserver of the public good, and the greatest direct contributor to stable, normal business conditions.

There are always some who will object, who illustrate the holding of a penny so close to the eye that it obscures the dollar a few inches beyond; but the broad policy of the greatest good for the greatest number should prevail.

Is not the commission thus legally and morally bound to execute this sacred trust in the interest of not one or a few elements of our national activities, but in the interest and for the benefit of the people as a whole?

THE SITUATION

The necessities of the railroads have not only been proved, but they have been formally admitted by the commission. The necessities of the country are equally obvious, and more than proved.

For many months past a large number of the industries wholly dependent upon the railroads have been practically prostrated, while others more or less dependent upon the railroads have been most seriously curtailed. This is not due to the European war, but is a condition of steady growth from about the middle of 1913. The effect of this prostration upon business in general had been clear for many months, not only to those engaged in railroad and cognate industries and in banking, but to the shippers and the general public.

The commission in its decision of July mentions protests against the advance sought. But it is significant that not a single business organization located in "official classification territory," where advances were sought, is listed as opposing a gen-

eral advance. On the contrary the country to-day is almost a unit for an advance.

These facts sufficiently reveal the extent to which the people have been directly touched in their pocket books by the inability of the railroads to operate and develop as they would under normal conditions.

The Interstate Commerce Commission is not only as good a place as any, but the logical place, for the United States Government to begin applying the principle that encouragement and solicitude for the welfare of business are as vitally important as supervision and restriction.

RAILROAD BUYING AND GENERAL PROSPERITY

Railroad purchases as a measure of general business prosperity were discussed last December by the writer in an address which undertook to show from statistics covering a period of years, that general depression had uniformly followed a marked decrease in railroad buying, while general business activity had regularly succeeded resumption of substantial outlays by the railroads.

Referring to the connection between railroad rates and railroad purchasing power: disclaimer was made of any thought that advances in rates should be permitted "in order that unnecessary purchases may benefit temporarily the railroad supply industries, or even the whole country. Waste never permanently benefits anybody." The proposition, it was pointed out, was "not to over-stimulate, but to remove an artificial restriction in the shape of rates too low."

What is the relation between railroad prosperity and general business prosperity? How is it measured, and how can it be demonstrated? It does not seem out of place to answer the foregoing by quoting from the writer's previous address:

Not many years ago, comparatively few business men, aside from those directly selling to the railroads, realized that *railroad prosperity means general business prosperity*.

Inasmuch as the railroads of the country constitute its greatest industry next to agriculture, with but one thing to sell—transportation—and since they are the ultimate consumers of everything they buy, their purchases extending to almost every department of business, many of them on a tremendous scale, it must be obvious how potent a factor they are in general business conditions.

As the iron and steel industry has long been recognized as the basic industry of the country and the truest index of general business conditions, and as the statement has been reliably made that railroads consume, directly or indirectly, from 40 to 50 per cent. of the iron and steel production of the country, it is manifest that the expansion or restriction of railroad consumption must vitally affect this barometer.

The ramifications of railroad purchases make it impossible to classify them in the aggregate, but it is believed that of those items officially compiled, tabulated and made public, perhaps no one item so accurately and typically reflects the railroads' general purchasing ability as that of new equipment, or new cars built each year.

The number of freight cars built each year, taken as a unit, to represent railroad purchases, has been projected on the well known chart of the Brookmire Economic Service for the ten-year period 1904 to October 1, 1914, inclusive, and the relation between railroad purchases and the trend of general business clearly shown.

While it is not possible, within the limits of this article, to trace in graphic detail the relative movements from month to month during this ten-year period, the chart clearly confirms the soundness of the doctrine that railroad purchases measure general business prosperity.

A NEW FACTOR IN 1908

It should be noted that up to 1908 these two factors, railroad purchases and general business, moved in normal relation; but in 1908 a new factor appeared, due to the placing of the rate-making power in the hands of the Interstate Commerce Commission.

Thus, for the first time were railroad purchases controlled by abnormal rather than normal conditions, and they have so continued, more or less, from 1908 to the present time.

The year 1908 was notably the leanest of business years, notwithstanding bumper crops, plentiful money and absence of disturbed political conditions—the three recognized elements making for good business. It likewise recorded the smallest number of cars ordered during the period, and the minimum of railroad purchases for many years past.

THE BUYING MOVEMENT OF 1912

In 1912 heavy purchases continued throughout the year, carrying general business to the high peak at the end of the year.

Just here it is again illuminating to consider the effect of railroad purchases.

The year 1912 was a presidential year, proverbially and historically a poor business year, and fraught with more of those uncertain elements ordinarily operating to check or hold back business than almost any previous year.

The "banking index" throughout the year ranged at about normal, with crop conditions good. But it is believed neither of these fundamentals would have offset the drastic change in politics, early and clearly foreshadowed.

Just why was 1912 the one exceptional presidential year? Why were the political conditions and political policies almost ignored?

If there had been any doubt as to the basic factor of railroad purchases, it was brought into bold relief in 1912, and that year furnishes the answer. It may be interesting, therefore, to note a comparison of conditions prevailing in 1908 and 1912.

Economists recognize three great fundamental factors as foreshadowing and affecting business. These are money, crops and politics. Let us apply these tests to the two years named:

1908	
Plethora Reserves.	Railroads not buying.
Bumper Crops.	Result:
No Disturbing Political Conditions.	Very low ebb of business.
	1912
Normal Reserves.	Railroads buying.
Normal Crops.	Result:
Very Disturbed Political Conditions.	Business very nearly booming.

NINETEEN MONTHS OF POOR BUYING

In 1913, the heavy purchases of new equipment continued during the first three months, but sharply declined at the beginning of the second half of the year, almost immediately sinking to the lowest level reached in several years.

It was here that the danger signal was set by this barometer; but naturally general business did not immediately feel this falling off of railroad purchases, being sustained by the "unfilled orders" or what might properly be termed the unspent momentum.

The conditions clearly foreshadowed at the middle of the year were realized and remained, not only throughout 1913, but in more accentuated form during the present year to date.

While it is true that the railroad supply industry is logically the first to recognize, and to partici-

pate in, a revival of general business, and is likewise the first to detect the signs and feel the effects of its impending decline, nevertheless the principle holds good, and shows itself throughout the entire fabric of general business.

THE CASE IN A NUTSHELL

Necessary deductions from the foregoing are:

That the railroads, consuming directly or indirectly between 40 and 50 per cent. of the production of the steel and iron industry—itself a basic industry—clearly are the prime factor in initiating a general business movement; conversely, a cessation of the purchases retards such movement.

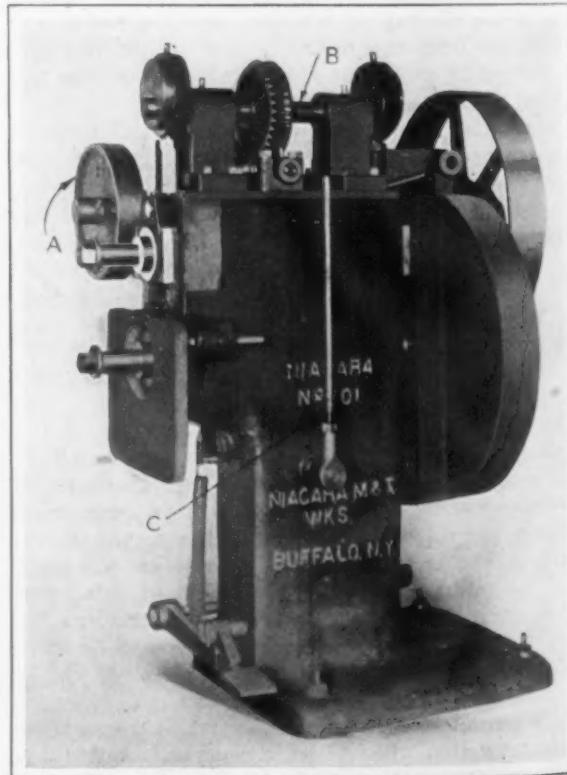
In other words, and regardless of favorable money conditions, crop conditions, political conditions, or any of the other fundamental factors in a sound business condition, unless the railroads are put in a position to make purchases, and do make purchases on a normal scale, normal prosperity is withheld from general business.

It is this great, salient feature of the question which the Interstate Commerce Commission is urged to recognize, as it has been recognized by the industrial and commercial world.

Sooner or later, in one way or another, the sound policy of "live and let live" must be applied to this question, if our railroads, our industries and our commercial enterprises are to enjoy a normal measure of prosperity. It is directly or indirectly a matter of vital importance to every individual in our nation.

Heavy Beading Machine for Sheet Metal

The Niagara Machine & Tool Works, 639 Northland avenue, Buffalo, N. Y., has developed a heavy machine for beading, swaging and similar operations along the edges of sheets of material used in the manufacture of automobile parts, steel barrels, etc. One of the special features of the machine is an elevating device for the upper main shaft, which is driven by a belt connection. This



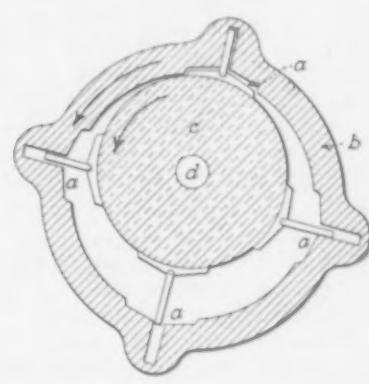
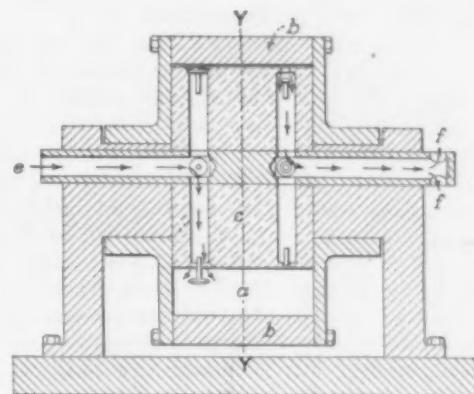
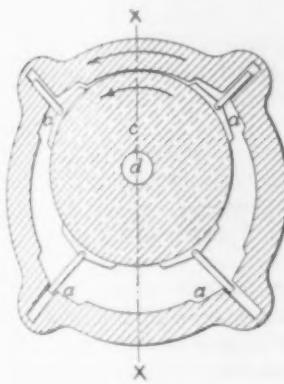
A Machine for Performing Heavy Beading, Swaging and Similar Operations Along the Edges of Sheet Material in the Manufacture of Automobile Parts, Steel Barrels, Etc.

device enables the work to be engaged gradually or the upper shaft to be kept in any particular position, while the beading and swaging operations are performed.

A worm and worm wheel are driven by the clutch pulley A through bevel and spur gears. The worm wheel is keyed to the shaft B, which carries an eccentric and adjustable pitman that is pivoted to the upper main shaft bearings on each end. The motion of the attachment is controlled by the hand lever C, and in this way the operator is enabled to start and stop the upper shaft in any position.

A Single-Stage Rotary Air Compressor

The Wernicke-Hatcher Pump Company, Grand Rapids, Mich., is marketing a single-stage rotary power-driven air compressor of somewhat unusual design. The operating principle of the compressor, it is pointed out, reduces frictional and heat losses and makes possible the compression of the air by an automatically balanced operation of the moving parts. The special features are indicated in the accompanying drawing. Either belt or direct-connected motor drive can be employed.



Section Y-Y

Section X-X

Cross-Sectional Views of a Single-Stage Rotary Air Compressor Showing Interior Construction and Successive Stages in the Rotation of the Compressing Elements

The worm runs in an oil-tight chamber and anti-friction bearings are provided to take up the end thrust. A clutch pulley controlled by a foot treadle provides the driving power for the main shaft. The operating lever for the shaft raising device and the clutch treadle are located in front of the machine in a convenient position for the operator. A set of compensating gears is relied upon to maintain the proper mesh between the gears on the two main shafts at all times.

The accompanying table gives the principal dimensions and specifications of the machine:

Diameter of main shaft, in.	2 $\frac{1}{2}$
Maximum distance between shafts, in.	6
Minimum distance between shafts, in.	1
Ratio of gearing, in.	1 to 7 $\frac{1}{2}$
Approximate weight, lb.	1,600

The working parts and the gauges have to be made specially to suit the particular requirements of each case.

The directors of the Cambria Steel Company, in notifying stockholders that the quarterly dividend will be paid in scrip to conserve the cash resources, state that the "earnings from January 1 to October 1, 1914, on the tonnage produced has been at the smallest margin of profit since the formation of the company, amounting to about \$1,375,000, being at the rate of 4 per cent. per annum on the capital stock of the company, compared with 13.8 per cent. last year. During this period the employees received \$9,520,685. The decreased earnings were caused: 1.—By the general business depression during the whole of this year, which curtailed the demand for steel. 2.—By the effect of the low foreign prices which under the new tariff we were compelled to meet or lose the business. That there were slight importations is due to the fact that the American manufacturers met the situation."

Towarzystwo Fabryki Machin I Odlewow, K. Rudzki & Co., Warszawa, Russia, inform *The Iron Age* under date of September 28, that they intend to purchase as speedily as possible 16,000 kg. of nickel, 98 to 99 per cent. pure, in the form of ingots, and desire to receive quotations.

The compression is effected in four pockets *a*, formed between a rotor case, *b*, and a solid rotatory compressing element, *c*, mounted on a rotor shaft, *d*, and internally eccentric with the case, both the case and the rotor revolving in the same direction at the same speed. The vanes forming the pockets slide in slots in the case, as a result of the eccentric motion of the rotor, and are pivoted to shoes which slide on the rotor surface. In one complete revolution each of the four compressing pockets will expand, drawing in air through an intake valve, *e*, and will then contract, compressing and expelling the air through a discharge outlet, *f*. The action between the rotor and the rotor case is equivalent to rolling friction, as contrasted with the action of other types of compressing units. The result of this design, it is emphasized, is that the power required for operation is materially less, and the temperature developed is reduced almost entirely to that of compression. The irregular contour of the rotor case is relied upon to give an effective cooling area for the dissipation of this temperature.

The intake of the air and the discharge are arranged to cause the air to pass through the rotor and the rotor shaft, as shown in the central portion of the drawing, this design being relied upon to promote a completely balanced operation. The compressor runs at a uniform speed and without any variation in load, the air being delivered at a uniform velocity and pressure. The general design also contributes to an automatic sealing of the compression pockets, so that the chance for leakage is reduced to a minimum. The absence of any material frictional motion between the moving parts contributes to a long life and absence of vibration. The elimination of water piping for cooling purposes and the lack of necessity for heavy foundations make the installation of the compressor a simple matter and permit a high degree of portability. The principle of compression involved provides a wide range of speeds.

The Southern Iron and Steel Industry*

Pig Iron Stationary—Steel Growing— Home Pig-Iron Consumption Should Be Increased—Glance at the Future

BY THOMAS K. GLENN†

So far as can be determined the Southern States made almost exactly one-fifth of the iron produced in 1810, and this proportion increased quite steadily, reaching its maximum probably between 1840 and 1850. This continued until the close of the civil war, when the loss of slaves, financial embarrassments and exhaustion of the charcoal put an end to it. In 1860 the Southern States were making something over 120,000 tons of pig iron (charcoal) annually. It is probable that during 1861 and 1862 this was greatly exceeded, but from that time on the output fell off as furnaces and mills were destroyed.

In 1870 the South had recovered only so far as to produce a little more than 8 per cent. of the American total iron output, but in the decade which followed progress was much more rapid, so that by 1875 the South's proportion had risen to over 12 per cent., which was about held in 1880. It was in this period, in 1876, that the first coke pig iron was made at the Oxmoor furnace in the Birmingham district, and we might say that it was from this date that the modern development began. Let us consider just here the possibilities of the South in the way of raw material, for without good coal and ore no very material progress can be made.

THE RAW MATERIAL OF THE SOUTH

Those who are supposed to be in position to know say that the Southern States have almost an inexhaustible supply of good coking coal that will probably outlive the supply of iron ore, and that the lack of this can in no wise hinder the future iron and steel development of this section. While there is no way of determining, yet it is given as an estimate by the United States Geological Survey that the coal fields of the South probably contain one-half of the total of the United States, and more than twice the coal of the whole of Europe. In 1880 the South was producing about 10 per cent. of the coal mined in the United States; in 1890, about 15 per cent.; in 1900, about 20 per cent.; in 1910, about 24 per cent. So the South has more than kept pace with the balance of the country in this respect.

No two authorities seem to agree on the amount of good workable iron ore in the Southern States (for estimating coal and iron deposits is largely a matter of guess work at best), but they are all impressed with the fact that there seems to be an almost inexhaustible supply, sufficient at least for a hundred or more years to come; so that in considering the iron and steel possibilities of the South we need have no immediate concern about the supply of raw material, although some of it may not be of so excellent a quality as is found in other sections of the country.

IRON AND STEEL DEVELOPMENT OF THE SOUTH

In considering the South's commercial development in iron and steel, it might be viewed from five standpoints:

1. That until very recently all of the South's

*From a paper presented before the American Iron and Steel Institute, Birmingham, Ala., October, 1914.

†President Atlanta Steel Company, Atlanta, Ga.

output had to be marketed in the form of pig iron, and that even now most of it is sold in that form.

2. That the bulk of the output is marketed at points far from the furnaces and is subject to heavy freight charges.

3. That the market price of Southern pig iron is always lower, and usually much lower, than that of similar grades at Northern and Eastern furnaces.

4. That the production of iron in the past ten years has remained about the same, while that of the country at large has shown a marked increase.

5. What can be done to improve all of these conditions?

For the purpose of comparison, it is interesting to note the production of pig iron in the South for the past several years as compared with other sections of the country. In the South are included Alabama, Virginia, Tennessee, Maryland, West Virginia, Kentucky, Georgia, Texas, North and South Carolina and Mississippi:

Year	South Tons	Percentage of increase	United States Tons	Per- centage of increase	South's percentage of total
1883	624,339		4,595,510	...	13.6
1893	1,567,299	151	7,124,502	55	22.0
1903	3,237,079	106	18,009,252	152	17.9
1913	3,285,957	...	30,966,152	71	10.6

From these figures it will be seen that the South's production of pig iron has remained about the same for the past ten years, while the United States has made an increase of over 70 per cent. and that the South's percentage of the production of the whole has, during the same period, fallen from 17 per cent. to 10 per cent.

In order to get at a fair comparison, we will take the South's progress in other lines:

	South, Millions of dollars	Percentage of Increase	United States, Millions of dollars	Percentage of Increase	South's Percentage of total
Val. of mfd. products..	1,860		13,000		14.3
1909	3,158	69	20,000	53	15.5
1900	1,564		4,717		32.2
Val. of agl. products..	3,297	110	9,532	102	34.6
1909	705		5,048		11.0
Resources of nat. banks	2,112	198	10,965	117	19.2

In each instance here given the percentage of increase has been greater in the South than in other sections of the country.

IRON AND STEEL PRODUCTION AND PRICES

Before going into the cause for all of this, it might be best to consider the selling price of pig iron in the Birmingham district as compared with Philadelphia, for instance, and what progress has been made in the development of the steel industry:

Average price of No. 2 foundry iron	Birmingham	Philadelphia	Difference
1912.....	\$11.55	\$16.06	\$4.51
1913.....	11.69	16.57	4.88

Although the start was late as compared with other sections of the country, the South can give a little better account of herself in the production of steel than in pig iron. The first open-hearth steel

was made in the Birmingham district in 1888 by the Henderson Steel & Mfg. Company.

The following table shows the growth in the production of steel in the South in the past 13 years as compared with the whole country:

Year	Bessemer. Tons	Open hearth. Tons	Total. Tons	Percentage of increase	In United States. Tons	Percentage of increase
1901	736,547	179,548	916,095	..	13,473,595	..
1913	673,063	1,183,977	1,821,040	98	31,300,874	132

From this comparison it will be noted that during the 10 or 12 years just past the production of steel has shown an increase of 98 per cent., manufactured products 69 per cent., agricultural products 110 per cent., national bank resources 198 per cent., while the production of iron has remained the same.

THE NEED OF A HOME MARKET

The reason why the development in iron has not been faster and in keeping with other sections of the United States is that there has not been a sufficient demand for it at home due to the woeful lack of manufacturing industries that use pig iron. The consumption of pig iron in the United States is about 650 lb. per capita, while in the South I estimate that it is not over 150 lb. The difference represents the backwardness of the South in the manufacture of finished forms of iron and steel. The present approximate consumption of pig iron in the South is 1,800,000 tons. If the South manufactured all the finished iron and steel that it now uses it would probably consume not less than 5,000,000 tons of pig iron. At the normal per capita consumption the South should use about 10,000,000 tons of pig iron.

Is there a remedy for this state of affairs that will permit the Southern iron trade to share in the general growth and prosperity of the Southern district? Yes; it is to sell the production in its natural market. Hitherto the greater portion of Southern pig iron produced has been sold in the Northern market; and this fact has been used many times as evidence of the wonderfully low cost of production of the Southern product. Does foundry iron sell at \$13 at Birmingham and at the same time sell at \$17.35 in Chicago because it has been produced \$4.35 cheaper in Birmingham than in Chicago? Not necessarily. Birmingham makes more iron than it can use, and the surplus must be marketed. Chicago needs more iron than it makes and can use the surplus Birmingham product at her price, but that the profit on iron used in Chicago which was made in Chicago is greater than the profit on iron made at Birmingham and freight paid to Chicago is shown by the figures in pig-iron production in Chicago as against the stationary production in the Southern district. It is too much to expect of one iron-making district that it can pay \$4.35 per ton, or about 25 per cent. of the total selling price, as freight, to foundries situated close to the furnaces of another good iron producing district and make as large profits—the handicap is too great.

But what is the natural market for Southern iron? It is the South itself, supplemented by export trade. Put the surplus pig iron produced in the South into steel. The larger portion of the steel used in the South is shipped in from the Northern district. On the principal steel products, Birmingham can reach, with freight no

higher than Chicago or Pittsburgh, a territory inhabited by 30 per cent. of the population of the United States. The rates to tidewater are lower than from either Pittsburgh or Chicago.

If a portion of the iron and steel produced could be regularly exported, the trade would be upon a more substantial basis than if dependent upon the domestic market entirely.

We have five steel plants in the South when we should have four times that many, and three of these are of very small capacity indeed. We have less than one-half as many foundries per capita as in the other sections of the country, while the showing in pipe works is only a little better.

THE FUTURE OF THE SOUTH'S TRADE

As to the future of the iron and steel trade in the Southern district, the past marks a period where the splendid vitality of the iron trade not only kept out irons of other districts but shipped iron into them, while the problem of making steel from Southern iron was being worked out. It has been conclusively demonstrated that from it steel for rails, plates, sheets, structural shapes and bars and wire products can be made of as good a uniform quality as is made to-day anywhere in the world.

How is it that Birmingham, with its reputed possibilities of making the lowest cost pig iron, presents such a poor showing in the growth of its iron industries when compared with the Northern district? An analysis of the South discloses the following facts: 1. That the low cost which has been claimed for making pig iron in the Birmingham district has been due in part to skimming the cream instead of taking the average cost, in part to improper cost methods of bookkeeping, and in part to the low cost of labor which prevailed here. 2. A limited quantity of pig iron can be manufactured very cheaply in the Birmingham district. 3. With the present equipment of mines, transportation methods and furnaces in the Birmingham district, the average cost of making pig iron is not very different from the average cost of making pig iron in Youngstown and Chicago, and Pittsburgh might also be included by those companies which, like the companies here, own all their raw material supplies.

This statement will probably come as a surprise and disappointment to those who are familiar with the so-called wonderful advantages of the Birmingham district. It is borne out, however, by statistics which I have presented in this paper, showing how our Southern production has remained almost a constant, while in the Northern district production has rapidly increased. For the Southern merchant furnace to be as big a money maker and as prosperous as a Northern merchant furnace, it will have to have over a period of years nearly the same average price for pig iron as the Northern furnace, and it is erroneous to think that Birmingham regulates, or ever will regulate, the pig-iron market of the world. It makes low prices on its pig iron because it has to make low prices in order to sell it in Northern territory, and the Southern furnaces will never prosper as they should until a market is developed for their output in the South; nor is there the slightest hope that steel is ever going to be made in this district so cheaply that it can be shipped to Pittsburgh and Chicago and return as much profit on the investment as money invested in iron manufactories in those districts. Our prosperity is dependent upon finding a market for our steel products in the South and upon export trade.

INFLUENCE OF THE STEEL CORPORATION

A few years ago the United States Steel Corporation became interested in the Birmingham district, and since that time has spent many millions of dollars in rebuilding and developing the properties of one of its subsidiaries. Only recently it has completed for another of its subsidiaries what is said to be one of the most modern nail and wire plants in this country. To my mind this is perhaps one of the most important developments that have ever taken place in this district, and it is destined to do more for its future welfare than any other one factor.

This may sound a little bit strange coming from a competitor, but nevertheless I believe it to be true. I trust that just in this connection you will pardon a personal reference. In 1907 the writer asked the president of one of the corporation's subsidiary companies what would be the policy of the corporation toward its competitors? He replied, "to live and let live," and that competitors would be treated fairly. This statement has been borne out in subsequent years, and I hope it will always be true. These officials seem to have had a broad and comprehensive view of the structure they wished to create, and have consequently avoided many complications that would have otherwise overtaken them.

A WISER NATIONAL POLICY NEEDED

Recent developments have emphasized the weakness of this country in its merchant marine, and while I know that a majority of our people have not taken kindly to a ship subsidy, at the same time I fail to see how we can come into our own without some kind of government assistance. If we are to take advantage of the opportunities offered in the South American countries we must have vessels sailing from our Southern ports at regular intervals, and when we get these the cargoes will be waiting for them.

For many years this country has had in effect a tariff which has, to some extent at least, protected its manufacturing industries until many of them have grown strong and no longer stand in need of this helping hand. Does it not seem strange, therefore, that just in the beginning of the era of industrial activity in the South, when this same helping hand is so badly needed here, it should be, and by our own representatives too, so ruthlessly withdrawn?

NOTE.—In the above I have quoted somewhat at length from a paper written by George G. Crawford, president Tennessee Coal, Iron & Railroad Company, in 1910, on the "Southern Iron Producing District," and also from papers by J. J. Porter, metallurgical engineer, Staunton, Va., and E. C. Eckel, mining geologist, Washington, D. C.

Birmingham Furnace Practice Development

History of the Ensley Furnaces of the Tennessee Company—How They were Gradually Brought Up to Efficient Condition

BY M. P. GENTRY HILLMAN*

The scope of such a paper being necessarily limited, it seemed that a short history of the Ensley plant of the Tennessee Coal, Iron & Railroad Company from the beginning of its operation to the present time would give the clearest view of the modern development of the blast-furnace practice of the Birmingham district. That no mention is made of the progress of the contiguous plants of the district is not to be understood as meaning they were not also improving their plants. The initiative of a large amount of progress belongs to them, and no one plant in the district can be said to have been first with all the improvements.

The questions of skilled labor and trained heads of departments were of the greatest importance when the development of the operation of the Ensley furnaces was undertaken, and it is not surprising that several years elapsed before the organization had been perfected into a compact and smooth-running machine. New mines for the production of fluxing stone, ore and coal for this plant had to be opened and equipped, and from the beginning it was apparent that there was not enough money to purchase the proper equipment. This lack of funds became acute two years prior to the panic of 1893 and lasted until 1898. The stock of the company being known during this period as "the football of Wall street," there were several changes of ownership, prejudicial to the good that would have developed had these changes not been made. The lack of money to purchase the proper equipment, the panic of 1893, and the several changes in ownership will present to you the main reasons why

a district so gifted by nature for the manufacture of cheap iron produced for so many years such poor financial results.

THE ORIGINAL ENSLEY FURNACES.

The four Ensley furnaces as originally constructed in 1888 were alike, each being 80 ft. high, 30 ft. from hearth to stock line, diameter of hearth 11 ft., diameter of bosh 20 ft., diameter of stock line 15 ft. 3 in., number of tuyeres 8. Each had three Weimer blowing engines, 42-in. steam cylinders, 84-in. blowing cylinders and 54-in. stroke, four 3-pass Gordon stoves with 23,900 sq. ft. heating surface, and vertical hoists, the filling being done by hand. Nearly, if not all, of the ore and limestone was broken in the stock house by hand. There were no bins; the coke cars were placed in the rear of the stock house, and the coke was forked from the cars to the coke buggies.

There was no laboratory and the chemical handling of the burden was superficial. The quality of the coke, all bee-hive, was poor, due to high ash and improper preparation in the oven. It also possessed the marked disqualification of being very irregular in quality. Large lumps of fluxing stone and ore were charged into the furnace and "lime-sets" were common.

The extreme height of the boshes, no chemical supervision of the burden, the large ore and fluxing stone, and the quality of coke added together made a furnaceman's life, to say the least, anything but pleasant. The output per furnace ranged from 100 to 130 tons of foundry iron. The blast, piston displacement, varied between 28,000 and 35,000 cu. ft.

*Carpenter & Hillman, Birmingham, Ala.

per min. Foundry iron was produced, silicon in No. 2 foundry being held as near 2.50 per cent. as possible.

The ores were from Red Mountain, and at that time the outcrop, that part of the vein under light cover and from which the limestone had been leached, constituted a part of the burden. The per cent. of hard ore, or the ore from which the limestone had not been leached, was three-fourths, and the soft ore, the leached, one-fourth. Occasionally limonite, known as brown ore, was used, but the supply was irregular and cannot be said to have been a regular part of the burden.

In 1891 a laboratory was constructed and chemical supervision of the raw material inaugurated. Better bee-hive oven management was obtained and the quality of the coke improved, though the ash was still high and the quality irregular. These improvements increased the output per furnace to about 150 tons.

In 1892 the first coal washer was installed, and this marked the beginning of the radical increase in furnace output. A coke of uniform analysis and of good quality was furnished and the results were highly satisfactory. Coincident with the introduction of the coke from washed coal came a change in furnace lines. The hearth diameter was increased, the bosh was lowered several feet and the diameter of the stock line decreased. Crushers were installed at the ore mines and quarries, and while the crushing was still imperfect, the largest lump passing through an 8-in. ring, it was a step in the right direction. The output increased to an average of 200 tons per furnace.

The improvements just mentioned called for an increase in air volume, which produced increased pressure; and it soon developed that the blowing cylinders with wooden piston packing and leather-faced valves were out of date. The continual bursting of cold-blast mains and the shells of the Gordon hot-blast stoves also demonstrated that these parts of the plant had seen their day, and it was also shown that the heating surface of the stoves was not sufficient for the increased volume of air. But there was no money, and the plant was left to fight its way with these handicaps.

THE PRODUCTION OF BASIC PIG IRON

With the exception of an increase in boiler power and improvements in furnace lines, the plant made no further progress until 1898, which year marked the advent of basic iron at Ensley, increase in number of tuyeres and by-product coke. As the best of the soft ore, the outcrop of Red Mountain, was getting scarce, brown ore was introduced in its place and the maximum quantity of this ore was used in the furnace burdens from 1894 to 1900.

On account of the increasing cost of brown ore and deterioration in quality the amount used gradually became less, and as very satisfactory results were obtained by judicious mixtures of the hard ores of Red Mountain, brown ore ceased to be an important factor of the furnace burden. To-day the very best results being achieved are obtained from the use of all hard red ore. It is highly probable that very little, if any, brown ore will in the future be used in the immediate Birmingham district.

The ratio of bases to acids of the slags when on foundry was about 8 to 1, and when on basic iron about 1 to 1. The large slag volume, about a ton of slag to the ton of iron, made the problem of control of sulphur in the iron an easy one, as the point of saturation of the slag by this metalloid was rarely, if ever, reached.

It may be of interest to relate here that No. 2 furnace was equipped with 24 tuyeres. The attempt to use them, however, was disastrous, and 12 were blanked; the furnace making a very satisfactory blast with the remaining 12 tuyeres. The use of 12 and 16 tuyeres was of great value, as the reduction in blast pressure was favorable to the weak cold-blast mains and stoves as well as the antiquated blowing engines.

The company, having no money to build ovens, made a trade with the Semet-Solvay Company in the same year, 1898, and 60 ovens, to which an addition was subsequently made, were built behind the stock house. The beginning of the use of this coke was the beginning of serious trouble with the furnaces, and the many irregularities made such an indelible impression on the minds of those connected with the operations that it has been difficult to remove these prejudices. However, the Semet-Solvay Company has conquered the problems it encountered and is to-day producing a superior coke, this also being true of the Koppers plant of the Tennessee Company at Fairfield. At present all the furnaces of this company are using by-product coke.

In July, 1895, the first basic iron made in the Birmingham district, had been produced by No. 2 Alice furnace, and the successful manufacture of this iron paved the way for a steel plant. As above stated, the Ensley plant commenced the manufacture of basic iron in 1898, and since the beginning of operation of the steel plant, November, 1899, with intervals of short duration on foundry, has steadily produced this grade.

BUILDING A NEW FURNACE FROM OLD MATERIAL

The boom in pig iron in 1899 found the Tennessee Company anxious to increase its producing capacity, but, as usual, the company was without funds to construct a new furnace. Doing the best it could under the circumstances, it purchased an old furnace in Florence, Ala., and together with what material was secured from another old furnace it owned at Cowan, Tenn., constructed No. 5. This furnace was smaller than the other four and was torn down in 1905 to be supplanted by the present No. 5. The plant continued to operate with the equipment until 1903, when twelve vertical Mesta blowing engines were purchased and installed. This afforded great relief in so far as cost of maintenance and steam consumption were concerned, but their full efficiency was minimized by the weak cold-blast mains and stove shells, the blast pressure being limited to 13 lb. In the same year a much-needed water purification plant was installed.

The period from 1902 to 1905 marks a pause in any progress in furnace output. The three chief causes were the rehabilitation of the equipment of the ore mines and rock quarries, pending completion of which improvements inferior and poorly prepared ore and flux were shipped, the strike of the coal miners and the decision of the management to quit washing coal for the manufacture of coke.

In April, 1905, No. 6 furnace, the first modern furnace at Ensley, was blown in. The furnace was 85 ft. high, hearth to bosh line 20 ft., diameter of bosh 20 ft. 9 in., diameter of hearth 14 ft., diameter of stock line 14 ft., double skip, Brown revolving top, four Massick & Crookes stoves, 46,000 sq. ft. heating surface, vertical Mesta engines, and 12 tuyeres. From the first the operations were successful and demonstrated that a furnace of this size was a practical unit in the Birmingham district. Handicapped with a large per cent. of coke made from unwashed coal, she averaged 330 tons,

and was the antecedent of the splendid furnaces which now constitute the plant. In the fall of the same year No. 5 was torn down and in 1906 a new furnace in her place was blown in, being practically a duplicate of No. 6.

DEVELOPMENTS SINCE 1907

In 1907 No. 4 furnace was dismantled and a furnace slightly larger than Nos. 5 and 6 was erected, the diameter of the bosh being 21 ft. 9 in., and of the hearth 14 ft. 6 in. From 1908 to 1914, Nos. 3, 2 and 1 were dismantled, and three furnaces larger than Nos. 6, 5 and 4 were constructed, the bosh diameter being increased to 22 ft. 6 in. and the hearth and stock line to 16 ft. As a matter of interest it may be well to mention that No. 1 is a thin-lined furnace. The work of these three furnaces has been superior to any results so far obtained in the South, one of them having made over 600,000 tons of iron and is still in good condition. The average output of the three large furnaces is about 400 tons per day.

The rapid development of the plant to its present state of efficiency and working out the proper preparation of raw material was begun in 1908 and has recently been consummated. All the coal from which coke is made is now washed, thus insuring fuel of low ash and uniform quality, and the ores and fluxing stone are properly crushed. The question of inadequate supply of water had from the beginning been a serious handicap. The completion of the splendid improvement at Edgewater in 1911 affords the plant ample supply of water and has made possible the installation of an efficient condensing plant by which thousands of horsepower, heretofore wasted, have been put into harness. It is also of interest to note that turbo-blowers have been introduced and are being successfully operated.

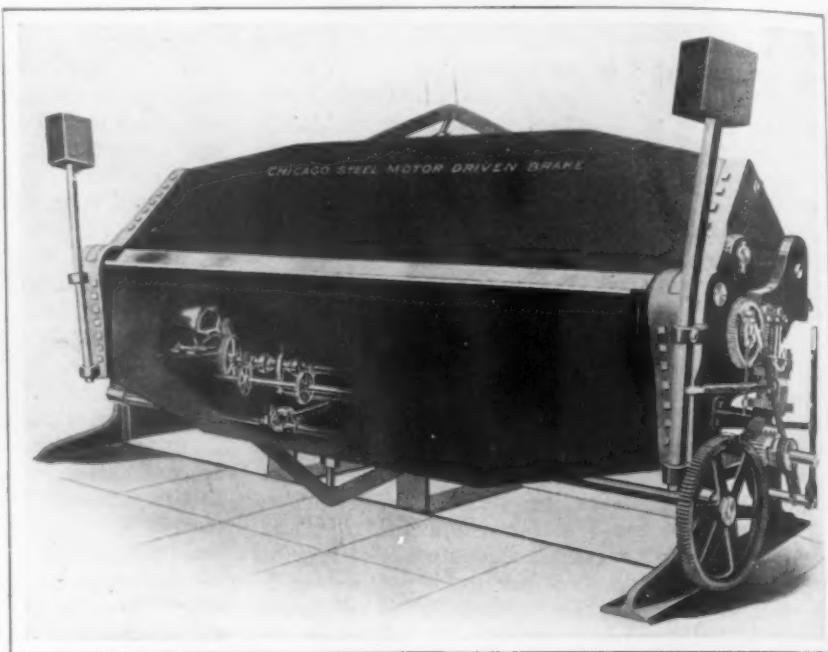
One cannot view the history of this plant without regretting that it ran so many years without the capital and organization necessary to keep it in the front rank of development. It is to be hoped that sufficient capital will be provided from the start for resources yet to be developed, and that stability of ownership will guarantee an operating organization which is not subject to changes, an organization that will reach its highest efficiency by years of continuous service.

I know of no greater pleasure than to be able to say to you that, largely through results now being secured at this plant, the great natural resources of the Birmingham district have at last come into their own, and if left in the hands of capital and competent organization will ever prove to be a part of the industrial success of the country.

Though the exportation of iron ore from Russia is prohibited during the war, it is announced that the government will authorize its exportation in a British or Allies' vessel, if the destination is a British or Allies' port.

Improved Heavy Power Bending Brake

A recent addition to the line of power bending brakes built by the Dreis & Krump Mfg. Company, 2909 South Halsted street, Chicago, Ill., is a motor-driven machine with the capacity to handle plate up to $\frac{1}{2}$ in. in thickness in 16-ft. lengths. The machine is driven by a 20-hp. motor and the location and arrangement of the driving gear is illus-



A Motor-Driven Power Bending Brake Capable of Handling $\frac{1}{2}$ -In. Plate in 16-Ft. Lengths

trated in the phantom view at the left end of the bending leaf. The clamping, elevating and bending adjustments are controlled by levers actuating sets of gears or clutches. The clamping device is said to possess a large amount of squeezing power.

The bending leaf is actuated by a segmental rack, with cut teeth, meshing with a pinion on the lower shaft. It is pointed out that by this arrangement the strength of wide steel plates is utilized, the strain in operation being delivered against their edges. The hinges and other end parts are made of steel castings, which are relied upon to prevent breakage. The angle of the bend is controlled by an automatic gauge consisting of a sliding collar on the steel rack, which raises the apron. When the apron is brought up to the point at which it is desired to stop the bending, the collar comes in contact with a lever that acts directly on the pulley clutch. A portion of the upper edge of the apron is removable which enables close reverse members to be bent. The clamping device is actuated by a miter gear from the driving shaft, the power being transmitted to a manganese bronze worm gear which is on an eccentric. The raising and lowering of the top jaw is controlled by a lever engaging a clutch at each end. An adjustment, consisting of an eccentric within the connecting link, is provided for different thicknesses of material and for sharp and rounding bends. The revolving of the eccentric increases or decreases the pressure on the sheet or plate being handled, while set and draw screws regulate the movement of the upper jaw forward or backward.

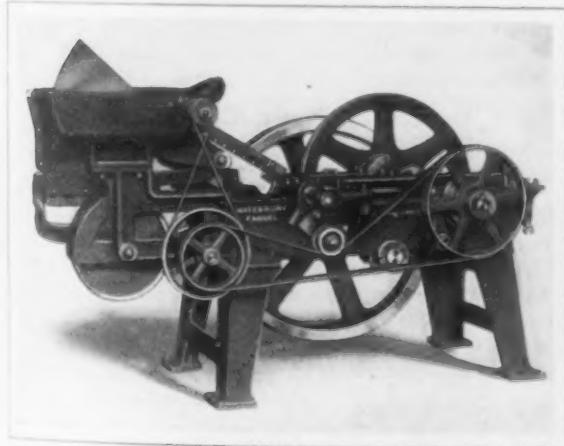
The motor is located under the bottom leaf of the brake, thus giving a self-contained machine. From the motor the power is transmitted through a rawhide pinion to a gear on the rear shaft. Two friction clutches, which regulate the raising and

lowering of the apron or bending leaf through direct and reverse gears, are mounted on this shaft and the lever controlling them is at the end of the machine, within easy reach of the operator.

Automatic Bolt Head Trimming Machine

Several sizes of machines have been brought out by the Waterbury Farrel Foundry & Machine Company, Waterbury, Conn., to trim the heads of bolts automatically. The field for which they are generally used is the trimming of cold headed blanks for either square or hexagonal forms of head, although they can also be used for trimming the flash from the underside of hot forged bolt heads. The capacity of the machines is a maximum diameter of $\frac{5}{8}$ in. and a length of 6 in. under the head, although the first dimension can be slightly increased in the case of hot forged heads, and care must then be taken to have the heads concentric with the shanks. The machine illustrated is designated by the builder as the No. 3 size, and will handle the maximum length of bolt where the diameter does not exceed $\frac{1}{2}$ in. This machine is built with a back geared drive to provide a large amount of power and is of compact construction.

The blanks to be trimmed are placed in the hopper and are automatically picked up and started down the inclined chute suspended by their heads. When they arrive at the bottom they are carried one at a time into a horizontal position in line with and between the trimming punch and dies. This is accomplished by a transferring mechanism that picks a single blank out from the bottom of the column in the chute and revolves it to a horizontal position, after which it is carried over to the punch and die. The hollow punch advances on the shank or body of the blank until it reaches the under side of the head and forces the latter against the die and finally into it, thus producing the desired shape



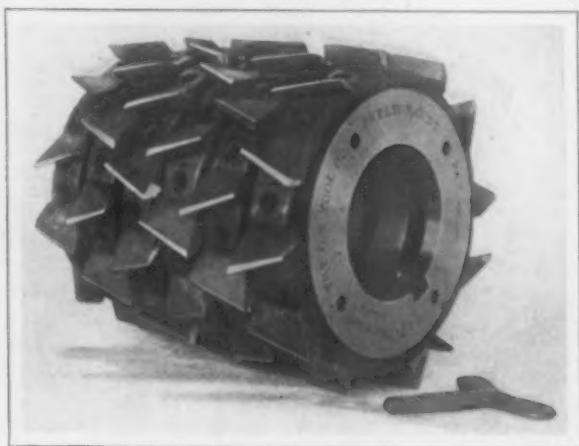
An Automatic Machine Which Can Be Used for Trimming Bolt Head Blanks to Either Square or Hexagonal Form or for Removing the Flash from the Under Side of Hot Forged Heads

of head. The bolt head remains in the die with the shank projecting until the gate has almost reached its rear limit of travel, when a knock-out actuated by the return motion of the gate pushes the bolt from the die.

The Shanghai Dock & Engineering Company, Shanghai, China, is building a steel collier for the United States Government, for use in the Philippine Islands. It will be 362 ft. long, of 6000 tons capacity, and will be equipped with patent coal bunkering elevators and automatic weighing machines.

An Inserted Tooth Slab Milling Cutter

A line of milling cutters having inserted teeth has been developed by the O. K. Tool Holder Company, Shelton, Conn. It includes slab cutters, one of which, the 5 x 6-in. size, is illustrated, and also a straddle milling cutter. Chrome nickel steel, which is heat treated, hardened and tempered, is employed for the bodies, while the inserted tooth cutters are similar to the maker's regular tools with round



A Recently Developed Milling Cutter of the Slab Type Having Inserted Teeth

shanks. The cutters are fastened in place with the key shown in the foreground, and if a blade should become broken, it can be readily removed and a new one inserted.

Larger Demand for Lighting Carbons

The National Carbon Company, Cleveland, Ohio, reports quite an increase in the demand for lighting carbons as a result of the war. For a long time lighting carbons for moving picture theaters in this country were supplied almost entirely by German manufacturers. This was in part due to the fact that two competing German importers have cut prices very low in fighting each other for American business. The German and French carbon manufacturers are the important factors in the lighting carbon industry outside of the United States. While small plants are located in a number of European countries the German makers of lighting carbons have been able generally to undersell the makers in other countries. Not only has the shutting out of German made lighting carbons helped the American plants, but a fair volume of orders is now coming from England, which had been supplied almost entirely by Germany, and a considerable inquiry is developing from other European countries. The American makers will probably be called upon to furnish lighting carbons for South America, but the demand from that quarter is not large. While the lighting carbon industry in this country has been benefited by the war, the National Carbon Company reports that its other lines have suffered because of conditions.

A change has taken place in the organization of the Canton-Hughes Pump Company, Wooster, Ohio. R. Bowen, Pittsburgh, Pa., has acquired the interest of H. H. Whiting and has been elected president and director of the company. Mr. Whiting has severed all connection with the company. The business will be under the management of Mr. Bowen, who has been prominently identified in the pump making industry for many years and for several years past has been general manager of the Epping-Carpenter Pump Company, Pittsburgh.

The M. E. Canfield Company has removed its offices from the Wright & Callender Building to the I. N. Van Nuys Building, corner Spring and Seventh streets, Los Angeles, Cal.



The Turbo-Blower for the Blast Furnace*

Output in Terms of the Steam Requirements Compared with Reciprocating Steam Blowing Engines—Turbo-Exhausters for Coke-Ovens

BY F. G. CUTLER†

A striking example of the possibilities of the operating economy of using low or mixed-pressure turbines is afforded by the Ensley plant of the Tennessee Coal, Iron & Railroad Company. At the time of its acquisition by the corporation, this plant had 7 boiler houses and 2 electric power stations, with a total rated capacity of 1800 kw. and a third power station of 1800 kw. capacity had just been completed. All of the engines in the plant operated non-condensing, and no power was supplied to the outside plants. Additional electric power was required for various purposes and the enlargement of the blast furnaces consequent to changing them from hand-filled furnaces to skip-filled furnaces taxed the blowing engines, so that it was found advisable to materially increase the blowing capacity at the blast furnaces.

A saving in steam requirements might have been obtained at the mill by the installation of compound condensing mill engines and the steam saved applied to the generation of additional power, but this involved the displacement of practically new equipment, which was ample for the work under non-condensing conditions. Also, at the blast furnaces, a new boiler house of 16,000 hp. capacity together with another plant of 6500 hp., the fact that the blowing engines were comparatively new, as well as certain conditions connected with water supply, practically committed this plant to steam-driven

apparatus. All of this original apparatus having been operated non-condensing, low-pressure turbines were of particular advantage to the plant in that no change in engine conditions was necessary.

By the installation of low-pressure turbo generators with condensers and cooling towers, installation of low-pressure turbo blowers with condensers and cooling towers at the blast furnace blowing engine house, two boiler plants have been dismantled, another at the local pumping station only operates occasionally, and two more at the steel plant are only operated during the time the mills are rolling, being shut down over Sunday, during which period the furnace boilers supply all the steam. Also all electric power is supplied for the operation of the American Steel & Wire plant at Fairfield; also for the by-product plant of the company at Fairfield, and all electric power required for operation of seven coal mines of the company in the neighborhood of Ensley, resulting in the shutting down of several boiler plants and reduction in load of others. Besides this a street railway line (the Birmingham, Ensley & Bessemer) is also supplied with all power required for the operation of 25 cars on 32 miles of single track.

This has been accompanied by an increase of product and a reduction in coal consumption, and the general result can probably

be best shown by the statement that the saving in coal with present equipment and methods of operating over former practice is estimated to be at the rate of 200,000 tons per annum.

LOW-PRESSURE TURBINE INSTALLATIONS AT ENSLEY

In the No. 2 power house adjacent to the rail mill are three 3000-kw., 25-cycle, 3-phase, 6600-volt generators operating at 1500 r.p.m. and driven by mixed pressure turbines which are supplied with exhaust steam through five regenerators, each 8 ft. diameter by 50 ft. long from two 55 x 66-in. twin reversing engines, one driving the 44-in. blooming mill and one driving the 34-in. roughing rolls, and a 52 x 72-in. Corliss engine driving the 28-in. finishing rolls. Steam from the pressure pumps and air compressor (after the feed water heaters are supplied) is also utilized for power.

The capacity of these regenerators is sufficient to absorb the extreme fluctuations in steam delivery as evidenced by the fact that under certain power conditions requiring the use of all available low-pressure steam, there will be no loss of exhaust steam at the back pressure valves over long periods. This is accomplished without raising the back pressure on the engines over about 4 lb. The 44-in. mill is one of the fastest blooming mills in the country, having a 24-hr. record of 2848 tons and a monthly record of 61,184 tons, both of these records being made in April, 1913.

The accompanying diagrams were obtained by a special recording apparatus consisting of a chart

*From a paper to be read before the American Iron and Steel Institute, Birmingham, Ala., October 30.

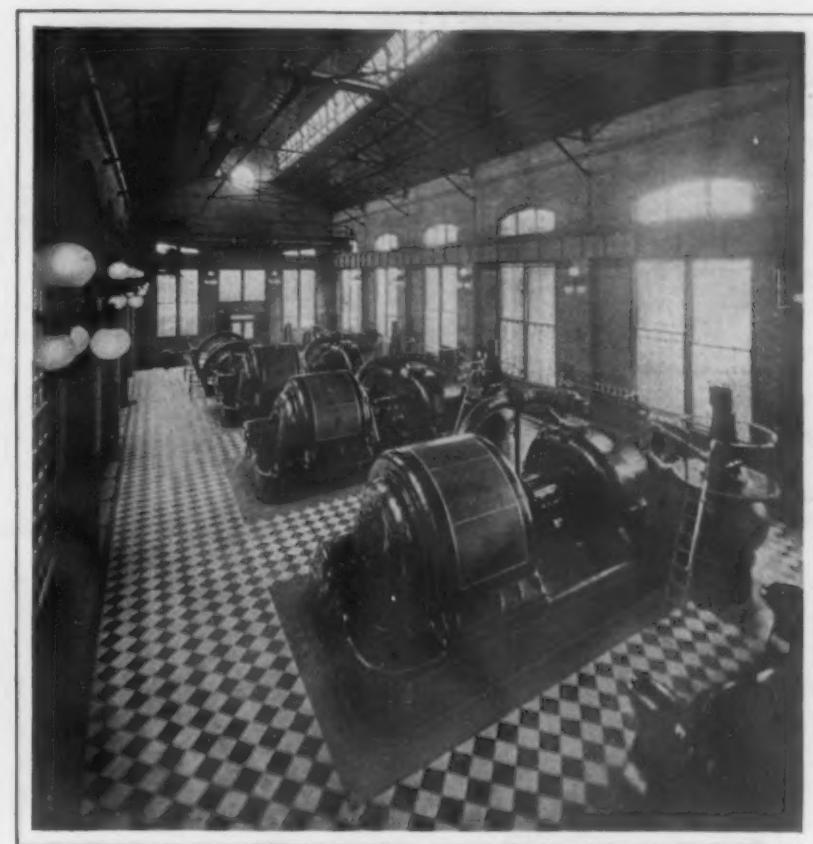
†Chief, bureau of steam engineering, Tennessee Coal, Iron & Railroad Company, Ensley, Ala.

moved by a small motor at constant speed using three steam indicators with light spring, one showing the variation in pressure in the exhaust line from the engines leading to the regenerators, a second connected to the regenerator steam space, and the third connected to the low-pressure supply line to the turbines, the relief valve on the regenerator blowing at about 4 lb. gage. The top diagram was obtained when the mill was rolling rails at maximum rate, the middle diagram when only the two reversing engines were operating and the lower diagram when the mills were starting up after a shutdown period.

The turbo-blower equipment at the blast furnace is located in two blowing engine houses. Two mixed pressure turbo-blowers each of 55,000 cu. ft. per minute capacity, are located in a new building adjacent to the No. 1 blowing engine house, taking exhaust steam from 16 long cross-head type vertical reciprocating blowing engines, the air tubes of which have Corliss inlet valves and poppet discharge valves. One mixed pressure turbine-driven blower of 45,000 cu. ft. per minute capacity is located inside the No. 2 blowing engine house, taking steam from 7 similar blowing engines. The last-mentioned turbo-blower was originally a high-pressure turbine-driven machine, located temporarily outside the same building and was put into operation during December, 1912, on No. 4 blast furnace (of 350 tons nominal capacity), which had just been relined. The operation of this furnace for the year 1913 with respect to apparent blast conditions, as shown by the accompanying graphical tabulation of records, is interesting.

In this compilation the blast delivery of the turbo-blower was obtained by recording the average setting of the scale beam on the constant volume generator, by which the speed of the turbine is controlled, and the delivery of the engines was obtained by using a figure of 365 cu. ft. of air per revolution of an 84 by 60-in. tub, the displacement of which was 383 cu. ft., this figure making an allowance of about 5 per cent. for induction loss and expansion of air in the clearance, this being the apparent delivery as derived from a number of indicator cards. No allowance was made for leakage in the cold blast line, stoves or furnace. As No. 4 furnace was blown through a new double riveted cold blast line and the stoves and furnace had just been repaired, the leakage in furnace connections during this period was believed to be small.

By the examination of the graphical log of operation of No. 4 furnace a great difference in the amount of air blown per pound of coke for blower operation and engine operation is apparent, and in order to reconcile the apparent discrepancy a series of tests was made in the latter part of 1913 to determine the actual delivery of the blower. Some of the difference was found to be due to an accumulation of dirt on the constant volume governor which increased its weight, thereby changing the effective setting of the scale beam.



Three 3000-Kw. Low-Pressure Turbo-Generators Viewed from Switchboard Gallery of No. 2 Power House, Ensley Division, Tennessee Coal, Iron & Railroad Company. The view opposite shows the cooling tower of the plant, of 18,600 gal. per minute capacity

After changing the calibration of the scale to agree with the nozzle test, the turbo-blower was put back on the furnace. The average operating records for a period of 15 days prior to and for 15 days after putting the turbo-blower back on the furnace are given below:

Blast Furnace Performance with Turbo and Reciprocating Blowers Compared

	Oct. 23 to Nov. 6, Inclusive	Nov. 8 to Nov. 22, Inclusive
Furnace blown by.....	Engines	Blower
Average product, tons.....	52,415	40,700
Cu. ft. of blast per minute.....	13.50	17.85
Blast pressure, lb. per sq. in.....	1,036,000	951,000
Coke consumed per 24 hr., lb.....	70.5	59.5
Cu. ft. blast per lb. coke.....	70.5	59.5
Coke per ton product, lb.....	3,012	2,952

Since the furnace conditions were not appreciably changed it will be seen from the above that the equivalent delivery of the blowing engines per revolution was about $(59.5 - 70.5) \times 365 = 307.5$ cu. ft., indicating an efficiency of delivery of the tubs of 84.4 per cent., or, since the displacement of the air tub was 383 cu. ft. per revolution, the ratio of the actual delivery to displacement was about 80.2 per cent. Similar comparisons were made for other periods for the two turbo-blowers at No. 1 engine house.

Tests were made August 8 and 9 of this year, given in the accompanying table. The apparent blast for the blower being obtained from mercury column on the Venturi meter on the suction pipe, which is the constant volume governor for these turbo-blowers, and by multiplying the r.p.m. of the engines by 365 for the test of engines.

For the first two of the above tests, these on A blower, it was possible to measure the low-pressure steam consumption of the turbo-blower by means of a heat balance on the condenser, as no other apparatus exhausted into the condenser, and the governing mechanism was arranged so that no

Tests of Blowing Engines, No. 1 Engine House

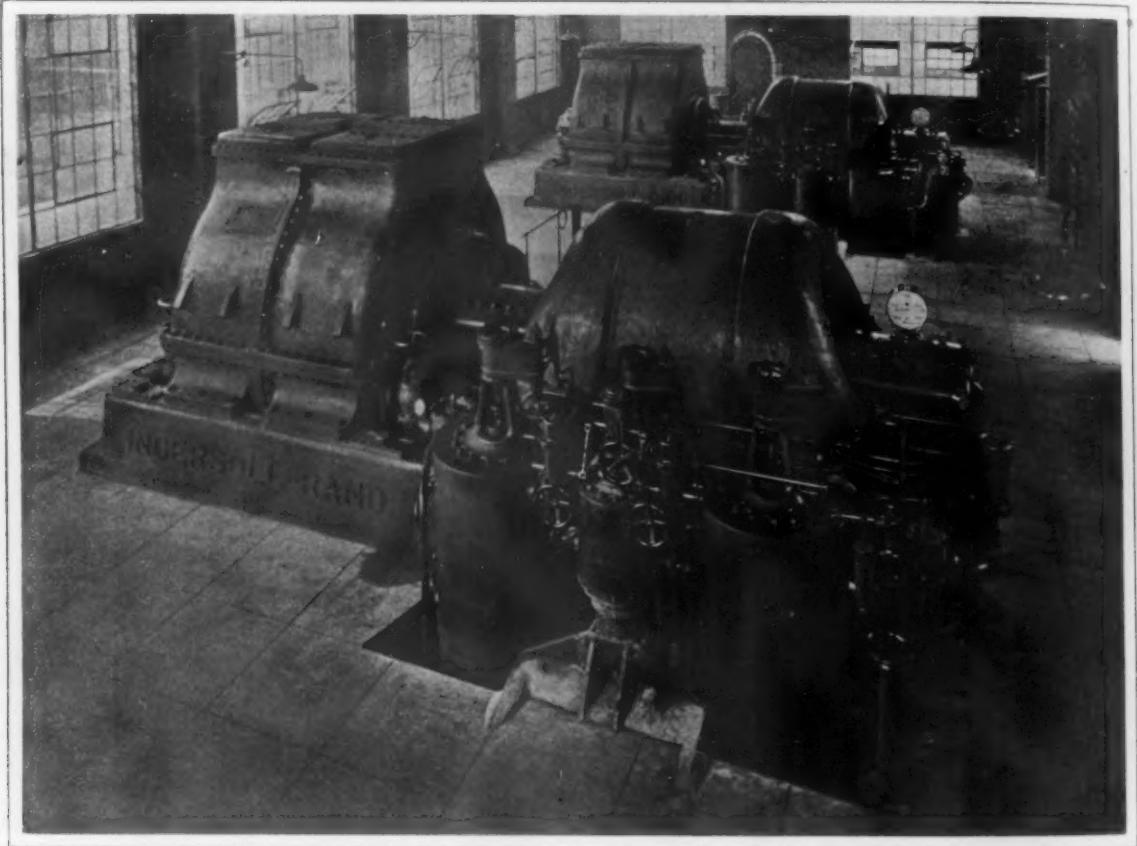
	Turbo A.	Turbo A.	Turbo B.	Turbo B.	Turbo B.	En- gine
Apparent blast, cu. ft. per minute...	27,960	42,300	30,630	39,920	44,930	48,500
R.P.M. blower or en- gines.....	2,054	2,470	1,934	2,410	2,691	133
Blast pressure per sq. in., lb.....	10.78	14.96	9.60	15.2	19.86	10.0
Orifice temperature, deg. F.....	146.0	183.4	152.8	197.2	233.7	184.6
Inlet temperature, deg. F.....	80.0	80.0	76.0	76.0	77.0	78.0
Orifice static pres- sure, in water.....	17.25	42.0	23.37	41.5	62.50	37.0
Orifice impact pres- sure, in water.....	18.00	43.0	24.50	43.75	64.62	38.00
Atmospheric pres- sure (Pm.), lb. per sq. in.....	14.46	14.46	14.46	14.46	14.46	14.46
Cu. ft. blast per min., standard conditions.....	31,887	48,190	37,350	48,350	56,730	45,085
Cu. ft. blower condi- tions.....	33,500	50,650	38,950	50,400	59,200	47,150
Ratio, actual blast to apparent blast.	1.141	1.138	1.218	1.212	1.262	0.93

high-pressure steam was used on this machine during the tests.

Steam Consumption of Blowing Engines

	Cu. ft. blast at 307.5 per rev.
Blast	
Engine No. 20.....	35.2
Engine No. 22.....	41.7
Engine No. 23.....	43.4
Engine No. 24.....	35.4
Engine No. 25.....	32.3
Total cu. ft. blast against.....	11.11
Total cu. ft. blast against.....	15.81
Indicated horsepower.....	23,655
Steam 142.7-lb. gauge; vacuum, 26.51 in.; quality, 38.5 per cent. Heat per lb. above hot well temperature B.t.u.	3,473
Steam supplied engines per hour, lb.....	1,098.5
Dry steam supplied engines per hour, lb.....	65,435
Steam per i.h.p., steam cylinders, lb.....	64,456
Blast per min. at 15 lb. $(23,655 \times 1.01418) + (34,180 \times 0.7855)$ cu. ft.....	18.5
Pounds of steam per 100 cu. ft. at 15 lb.....	51,500
	2.09

The steam consumption of 2.09 lb. per 100 cu. ft. of actual blast corresponds to 18.5 lb. per I.H.P. hour. When operating non-condensing against 2 lb. back pressure the steam per 100 cu. ft. of blast at 15 lb. is about 3 lb., corresponding to a gross



Ingersoll-Rand Turbo-Blowers Each of 55,000 Cu. Ft. per Min. Capacity, Ensley Division

Steam Consumption of Turbo-Blower

Low pressure steam-pressure in pounds per sq. in. gage.	2.8
Vacuum corrected for barometer.....	26.64
Quality low pressure steam to turbine, per cent.....	97.5
Heat per lb. exhaust steam above hot well in B.t.u.	1,047.2
Total exhaust steam per hour to turbine, lb.....	90,300
Equivalent dry steam per hour to turbine, lb.....	88,650
Brake horsepower at 70 per cent. efficiency.....	3,435
Exhaust steam per brake horse power hr., lb.....	25.8
Cu. ft. blast per minute (standard conditions).....	48,190
Blast pressure, lb. per sq. in.....	14.96
Equivalent cu. ft. blast per min. against 15 lb.....	48,105
Dry exhaust steam per minute, lb.....	1,477
Pounds exhaust steam per 100 cu. ft. blast at 15 lb....	3.07

In order to check the steam saving by installation of turbo-blowers, it is necessary to know the consumption of the original equipment, and a similar test was made on five blowing engines at No. 2 blowing engine house. The principal data of this test are here given, the actual blast delivery being taken as 307.5 cu. ft. per revolution as shown by previous calculations, the indicated horsepower, however, being based on indicator card results.

saving of 30 per cent. by condensing these blowing engines.

By the use of Molier diagram the quality of exhaust steam from these non-condensing engines is found to be about 95 per cent. On this basis, 3 lb. of dry steam delivered to engines per 100 cu. ft. of blast would furnish 2.85 lb. dry exhaust steam, which in the turbo-blower would blow $2.85 \div 3.07 \times 100 = 93$ cu. ft. of blast, both engines and blower delivering against 15-lb. blast pressure.

With blowing engines operating non-condensing as was formerly the case at Ensley, a 30 per cent. saving in steam prime movers was made by condensing; and by operating the same engines non-condensing and utilizing the exhaust steam in low pressure turbo-blowers a gross delivery over original non-condensing conditions of about 93 per cent. more air was made, making the saving by installation of turbo blowers over non-condensing operation about 48 per cent. Local conditions requiring the

use of cooling towers modify these figures somewhat, although the relative saving is not greatly different.

USE OF TURBINES IN OTHER OPERATIONS

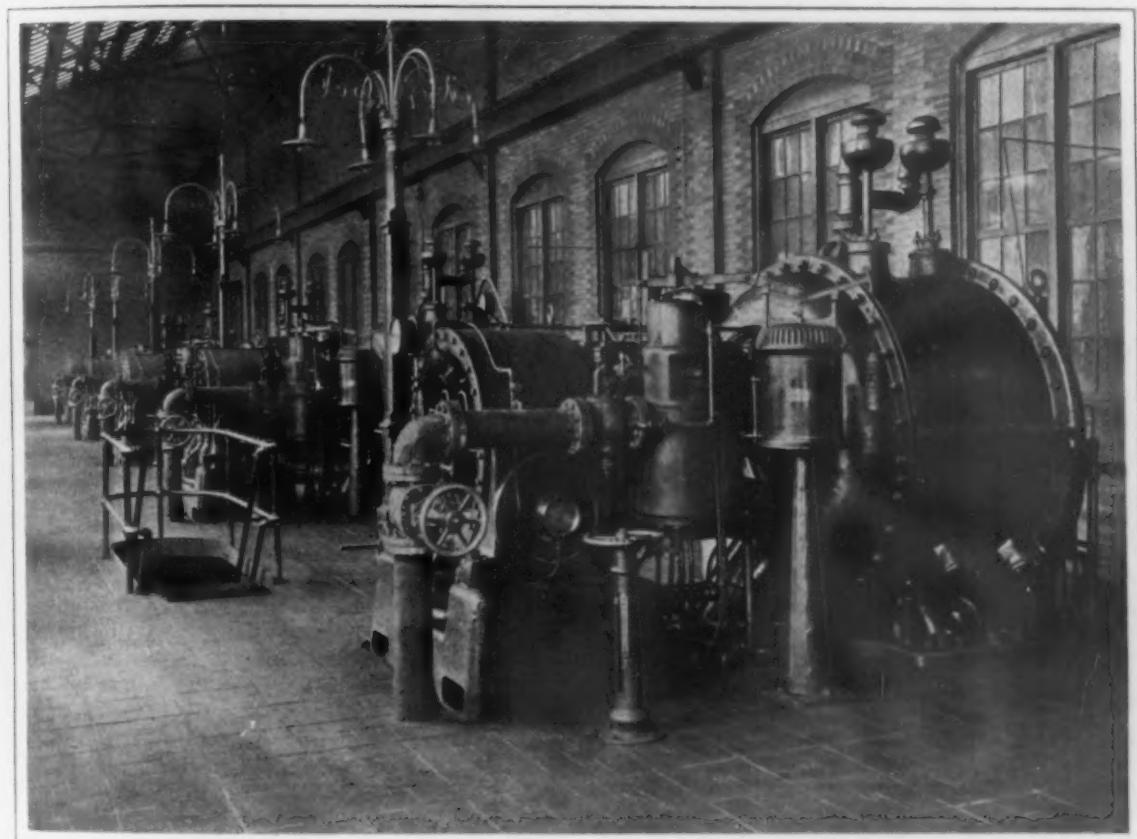
The operation of turbo-blowers and exhausters in by-product work is a comparatively recent service and the Tennessee Company was the first to install them in this country and probably the first anywhere to use them exclusively. At the by-product plant at Fairfield there are five two-stage exhausters driven by three-stage high-pressure turbines, each of 9,000,000 cu. ft. capacity in 24 hr., that pull the gas from the batteries through the cooling apparatus and deliver the gas through the tar extractors to the saturators. Also at this plant there are two three-stage high-pressure turbo-driven boosters, one of 24,000,000 cu. ft. and one of 28,000,000 cu. ft. capacity, one operating at a time, and delivering

Discussion by Alexander L. Hoerr*

The statement is made in the paper that "this has been accompanied by an increase in product and a reduction in coal consumption . . . estimated to be at the rate of 200,000 tons of coal per annum." This is a most remarkable saving and very creditable to those responsible for it. The writer, however, questions the completeness of the statement of the causes of this saving and questions the possibility of such a saving through the installation of low pressure turbines alone.

SOME SAVING DUE TO COLLATERAL IMPROVEMENTS

The saving must be to some extent due to collateral fuel improvements, such as the connecting of boiler houses by steam mains, the substitution of coke oven gas for coal, improvement in the pumping situation, substitution of motors or tur-



Exhauster House, Showing Five 9,000,000-Cu. Ft. Two-Stage Turbo Gas Exhausters, By-Product Division

surplus gas through a 24-in. line to the Ensley steel plant.

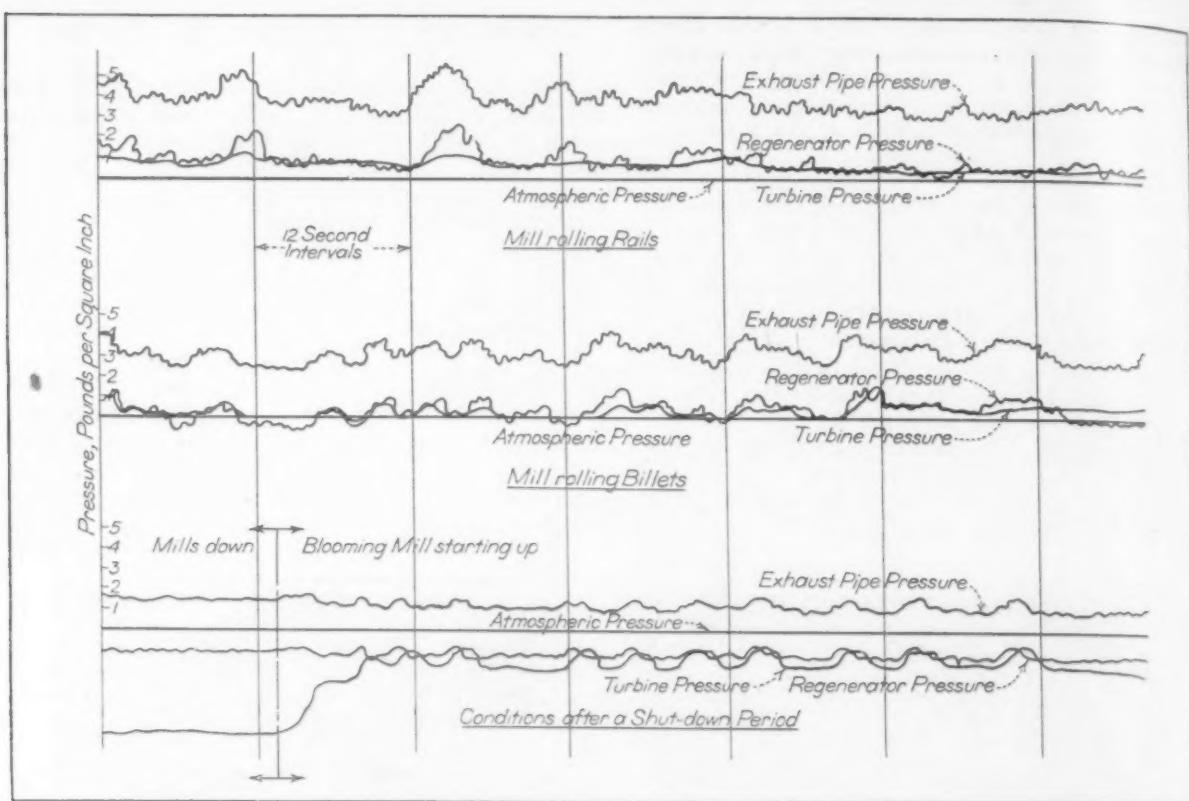
With the usual type of apparatus a much larger bi-product building and heavier foundations would have been required, and the experience of nearly three years' operation has justified the claim that this type of apparatus has a lower operating cost for labor, repairs and lubricants, as well as steam; and with the exception of trouble with shaft packing due to action of gas on the metal used originally the installation has been successful in every way. There is a peculiar advantage in the use of turbo-exhausters in bi-product service in that the centrifugal action of the blower throws out the small particles of tar or tar fog carried with the gas, almost eliminating the work required of the tar extractors, which are located between the exhausters and the saturators. Three per cent. of the total tar production of the plant is recovered from the drains on the turbo-exhausters.

bines for small inefficient engines or similar changes.

The most interesting thing the tests show is that a furnace can be satisfactorily blown by a rotary blower. It should also be noted that the paper tends to disapprove the claim made for such blowers, that better operation would result due to more regular blast. It, however, confirms the frequently expressed opinion of blast furnace men that irregularities in ore, stone, etc., have more influence than irregularities in the blast.

If the mill load fluctuates rapidly through a wide range, sending the steam to the exhaust system in violent puffs, while the turbo-generator in most cases carries a load originating largely outside the mill which furnishes the steam, the changes in load will not synchronize with the changes in the exhaust steam supply and although some peaks will be flattened out by the regenerators, there will be

*Steam and hydraulic engineer, National Tube Company, McKeesport, Pa.



Pressure Records in Connection with the Use of the Regenerator in No. 2 Power House

frequent loss of steam to the air. In such cases as these it is the writer's belief that the installation of a compound reversing condensing engine for the mill drive is best. This will carry the mill load with the minimum amount of steam and the amount

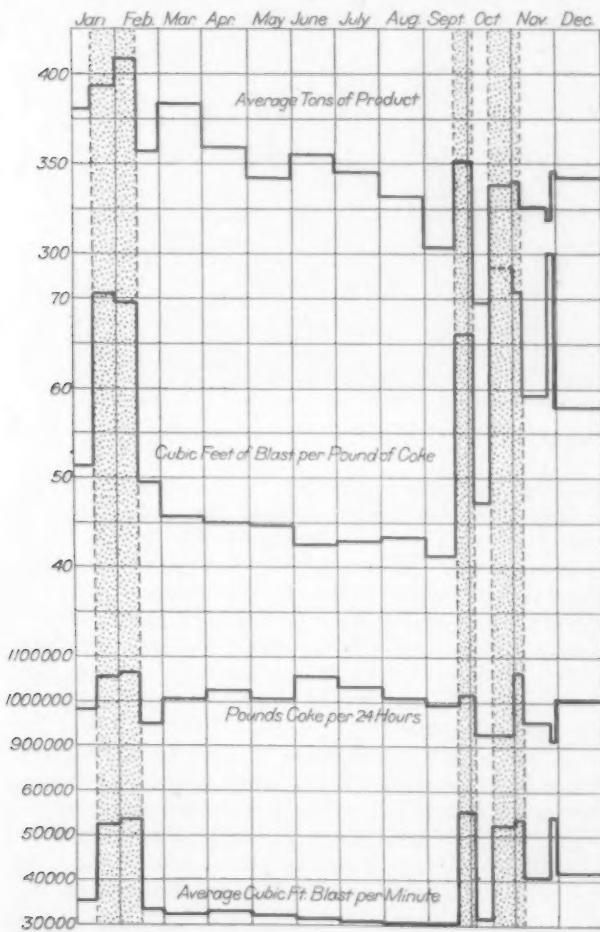
saved over non-condensing conditions can be supplied to a high-pressure turbine for the generation of the necessary power.

THERMAL EFFICIENCY NOT THE ONLY DETERMINING FACTOR

The point to be made is that after all it is not the combination having the highest heat efficiency that we want, but the one having the highest dollar efficiency. The first turbine units with which the writer had any experience were installed in a steel plant in 1905. They were used for driving centrifugal pumps which were connected to the general mill supply lines. This purchase was not based on the thermal efficiency of the units alone but on the combination of the cost per unit, the cost of building and foundations and the cost of steam as determined by the efficiency of the unit and the price of coal at the plant. Compound condensing reciprocating pumps would have reduced the cost of the steam, but would have so greatly increased all other items of cost as to make their installation a losing proposition. In this, as in many other cases, the use of the less efficient unit resulted in the higher plant economy.

Turbine-driven centrifugal pumps in the large sizes, operating under steam conditions such as obtain at steel mills, that is, saturated steam at not to exceed 165-lb. pressure, can be purchased with a guaranteed duty of approximately 120,000,000 ft-lb. per 1000 lb. of dry steam. With better steam conditions this can be increased. With such units available no plant with coal at \$2 or less a ton can afford to install compound reciprocating pumps for general service without making a careful comparison of the total operating costs of both types.

The National Tube Company has low-pressure turbine-driven generators at three of its plants—National, Lorain and Kewanee—and is installing high pressure turbine-driven service pumps and boiler draft blowers at National works. A complete description of the National works low-pressure turbine and regenerator installation with test



Operation of No. 4 Blast Furnace, Ensley Division. The Shaded Areas Cover Periods When the Blowing Engines Were Used and the Unshaded Areas Cover Periods When the Turbo-Blowers Were Used

ata is given in a paper written by F. E. Leahy and published in the Proceedings of The Engineers' Society of Western Pennsylvania for February, 1914. Since the reading of this paper, however, there has been an addition to the plant, a description of which may be interesting.

AIR WASHERS FOR ELECTRIC MACHINERY

The turbine station is located in a particularly dirty place, in the immediate vicinity of a blooming mill, slabbing mill, pig-casting machine and ladle house, and on account of metallic dust in the air used for cooling the turbo-generator, considerable trouble was experienced due to the insulation on the field winding breaking down and causing grounds. This happened on three different occasions, each time requiring about five days' time to remove the field, repair the insulation and put the field back in place. To overcome this trouble, an air washer, or as it is termed by the manufacturer, a humidifier, was installed for the purpose of cleaning the air used for cooling the generator. This apparatus is guaranteed to remove 95 per cent. of all the solid matter entering and will saturate the air, obtaining thereby the greatest possible cooling effect and increasing the capacity of the generator by about 15 per cent. for the same maximum temperature of the windings. The humidifier has a normal capacity of 16,000 cu. ft. of air per minute with an overload capacity of 20,000 cu. ft. per minute, and requires about 80 gal. of water per minute.

This apparatus was put in operation June 10, 1914. The sediment found in the settling tank on July 8 filled 10 buckets of about 540 cu. in. capacity each; on September 6, 1914, 17 more buckets of sediment were removed from the settling tank. While some of this dirt came in with the water, the bulk of it was taken from the air passing through the cleaning apparatus.

To summarize the case of the turbine for mill use the writer would say that with the steam engine and gas engine it has a place as an economical prime mover. It is not the best prime mover for all purposes and the question of its use will often be decided by local operating conditions. Its adoption should never be based on a calculation which over-emphasizes thermal efficiency, since thermal efficiency is only one of many factors, the sum of which is a measure of plant economy and the object sought is the maximum value of this sum.

The illuminating power of kerosene oil has been investigated by William Kunerth, assistant professor of physics and illuminating engineering at the Iowa State College of Agriculture and Mechanic Arts. The results are published in bulletin No. 37 of the Engineering Experiment Station at the college, Ames, Iowa, and the pamphlet report is of 29 pages, with charts and other illustrations, comparing the illuminating power of the different kerosene oils used in the state.

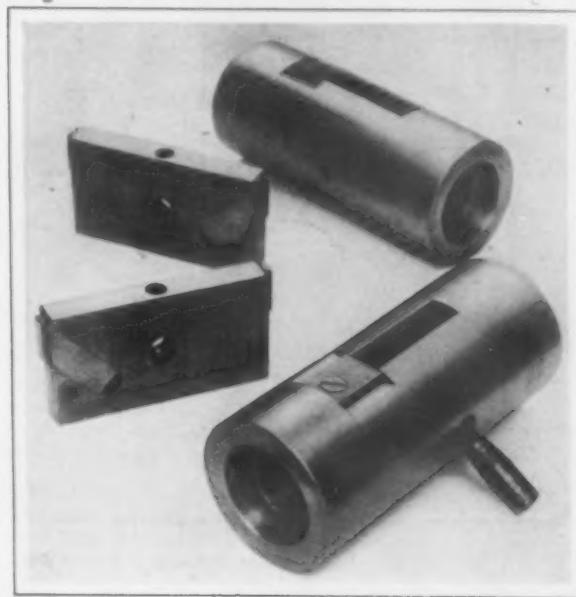
The spelter-refining industry is said to have made such progress in Japan that refiners are saddled with ever-increasing stocks. The output of the Osaka Zinc Refinery Company has increased to 150 tons a month, and that of the Mitsui refinery to 400 tons, whereas the monthly consumption in Japan has fallen to 300 tons, the visible stock thus increasing month by month. It is said that the refiners will establish uniform prices to avert needless competition.

The American Locomotive Company has received an order for 15 Mikado type locomotives from the Minneapolis & St. Louis Railroad.

Head for Long Lathe Boring Bar

A boring or reaming head for a long lathe boring bar has been brought out by the Kelly Reamer Company, Cleveland, Ohio. The principal advantage claimed for this tool, which is designated as the XX type C boring and reaming head, is in the saving of excessive weight and transportation charges on bars for long boring and reaming purposes. This head is made in diameters of from $2\frac{1}{2}$ to 6 in., in which the Kelly boring and finishing reamers are used in sizes ranging from 3 to 12 in. in diameter.

The head is double shouldered and threaded at each end for attaching bars of any required length. Pieces of shafting of the length desired may be screwed into each end for a lathe boring bar or into one end only for a large turret bar, or a tapered



A Boring or Reaming Head That Has Been Recently Developed for Use in Conjunction with a Long Boring Bar in a Lathe

shank inserted in one end converts it into a vertical boring or reaming tool. This head is made with 0.0005 in. of side float and 0.00025 in. of end float, which is said to be correct for properly carrying out the floating reamer principle, giving the rigidity required of a rigid tool and the accuracy and finish of a floating reamer.

The roughing and finishing reamers interchange in the slot of the head and are held in place by a tapered locking screw at the center. This tapered screw is tightened for the boring operation and loosened slightly for the floating reamer for finishing. Before using a floating reamer the hole should be bored true to within 0.005 or 0.006 in. of size. Then the feed marks only are removed with the floating reamer, thus insuring accuracy and finish.

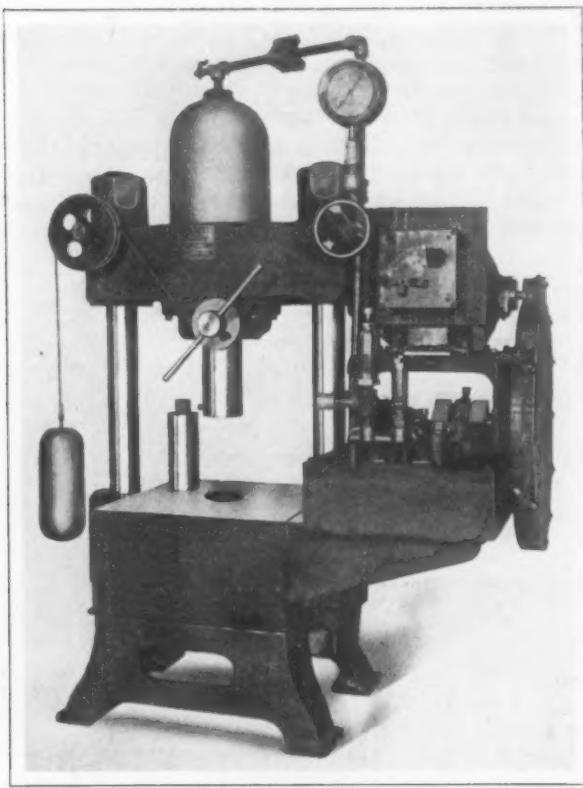
The illustration is made from a mirror photograph to show both ends of the head. It also shows the reamer removed from the slot, in which various sizes of reamers may be interchanged.

The Broadway Foundry Company, formerly located at 4085 Dille avenue, Cleveland, Ohio, has moved to the factory building formerly occupied by the Cleveland Welding Company on Franklin avenue near West Eighty-fourth street. S. S. Sanders is president and R. M. Katz is secretary.

The Cleveland Machine & Knife Company, Cleveland, Ohio, has changed its name to the Cleveland Knife & Forge Company. The change was made owing to the fact that this company is now making a general line of forgings in addition to machine knives.

Hydraulic Broaching and Forcing Press

A self-contained hydraulic broaching and forcing press, having the motor and pump mounted on an extension of the base at one side, has been developed by the Hydraulic Press Mfg. Company, Mt. Gilead, Ohio. It is capable of exerting a pres-



A 75-Ton Self-Contained Hydraulic Broaching and Forcing Press in Which the Pump and the Motor Driving It Are Mounted on an Extended Base at One Side

sure of 75 tons and is designed for handling a wide range of broaching and forcing work that is encountered in machine and automobile shops.

The ram, which is counterbalanced, is controlled by a hand windlass, an arrangement which is relied upon to enable it to be raised or lowered to accommodate various sizes of work. When the ram is lowered by the action of the hand windlass the vacuum produced by its downward movement causes the cylinder to be filled with water. This action, it is pointed out, provides for the application of pressure to the broach or the material in the press as soon as the motor and pump are started. Extension blocks, varying in length or shape according to the size of the pressing surface or the height of the daylight space, are provided for the ram.

A two-plunger horizontal pump, having plunger diameters varying from $\frac{5}{8}$ to 1 in., with a common stroke of $3\frac{1}{2}$ in., operates the ram. An automatic knock-out attachment is provided to limit the pressure to a predetermined maximum, the figure being any desired point within the limits of the rated capacity of the press. It is emphasized that all parts of the pump are easily accessible, which eliminates the difficulties generally encountered in making adjustments and re-packing the plunger. A single gear reduction is illustrated, but if desired the pump can be equipped with a double reduction. The operating motor, which is rated at 2 hp., and the starting rheostat are located within convenient reach of the operator.

The press is of steel construction, the beams

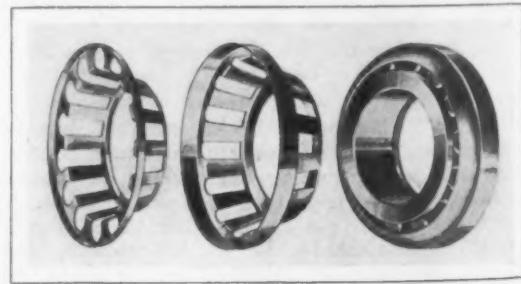
being formed by steel lugs cast on the cylinder, while the sills are formed by lugs cast on the base plate. Cold rolled steel shafting is employed for the strain rods. The brackets which form the pump base are of cast iron and are bolted securely to the main portion of the press. This means of fastening is employed as it is sometimes desirable to operate the press from an independent pump or an accumulator system.

The speed at which the press is operated varies with the diameter of the pump plunger. The larger the diameter of the plunger, the more rapid, of course, is the movement of the ram, since more water is forced into the cylinder with each stroke of the pump. The diameter of the ram in the press shown is 10 in. and the stroke of the ram is 12 in., which gives a daylight or stock space of 18 in. The press bed is 24 in. square and has an opening directly under the ram. The function of this opening is to permit the broach to pass through after it has operated on the work and be caught in a wooden box. The over-all height of the press is 76 in.

Test of a Taper Roller Bearing

The Bock Bearing Company, Toledo, Ohio, recently subjected one of its roller bearings to a continuous test of 100,000,000 revolutions, under a thrust load of 1000 lb. As the rate of revolution was 2050 r.p.m., over a month was required for the test and for three days the load was increased to 3000 lb. The bearing tested had an outside diameter of $3\frac{1}{2}$ in. and an internal diameter and overall length of $1\frac{1}{2}$ in. It was one of three special bearings designed for use in connection with worm and spiral bevel gears where a heavy thrust load had to be carried. It is stated that at the conclusion of the test no part of the bearing exhibited signs of wear.

The bearing, which it is emphasized is capable of performing the functions of both the annular and thrust types, consists of six parts, two roller cages, which are illustrated, the retainer, the roller, the cup in which the bearing is assembled and the inner cone. The ends of the tapered rollers are finished to form true ball surfaces, and it is pointed



View of a Taper Roller Bearing That Was Subjected to a Thrust Load of 3000 Lb. Showing the Inner and Outer Roller Cages and the Assembled Bearing

out that these ends roll on the race at a point which is always directly in line with the rolling surface or apex lines of the rollers. In this way rolling action is claimed to be secured under all conditions without slippage on any of the parts.

Idle cars on railroads of the United States and Canada increased by 20,955 in the first half of October. The net surplus on October 15 was 151,982, against 131,027 October 1. In the month of September there was a decrease in idle cars amounting to 39,299. The greatest net surplus of cars reported in 1914 was 241,802 on June 1.

MACHINE TOOL CONVENTION

Large Attendance of Members of National Association—A Growing Confidence Prevailing

The annual meeting of the National Machine Tool Builders' Association at the Hotel Astor, New York, Thursday and Friday, October 22 and 23, brought together a large and representative body of members. The gathering was of exceptional interest, because of the character of the papers and discussions, and also in the interchange of experiences and opinions as to the condition of business. A note of optimism pervaded the convention atmosphere. Many of the members had received substantial orders, in some cases aggregating a great total, for export to Europe, and the trend of domestic business is considered better in its direct effects upon the machinery trade.

The old board of officers was re-elected as follows: President, W. A. Viall, Brown & Sharpe Mfg. Company, Providence, R. I.; first vice-president, J. B. Doane, American Tool Works Company, Cincinnati, Ohio; second vice-president, D. M. Wright, Henry & Wright Mfg. Company, Hartford, Conn.; treasurer, Albert E. Newton, Reed-Prentice Company, Worcester, Mass.; secretary, Charles L. Taylor, Taylor & Fenn Company, Hartford, Conn. Charles E. Hildreth, Whitcomb-Blaisdell Machine Tool Company, Worcester, Mass., will be re-elected general manager by the board of officers.

At the opening session the reports of officers were read. In the course of President Viall's address he said:

PRESIDENT VIALL'S ADDRESS

During the past summer one of our Western members called our attention to the fact that efforts were being made on the part of the railroad people to re-classify the freight ratings on some of the products of members of our association, and the question was asked as to whether we had busied ourselves regarding such a matter. This has not been done by us in the past, and it seems fitting that it should be one of the activities of our association, gathered together as we are for business purposes, and it certainly cannot be violating any laws of the land if we act in unison on such a vital question as the railroad tariff. As an association, it is fair to be presumed that we are in accord with helping the railroads in getting a fair return for their investments, and would not stand in the way of any legitimate requirements for a proper compensation for services rendered, but if the railroads undertake to differentiate unjustly against certain classes of our industry it would seem as though it would be imponent upon us to discuss such a matter as an association.

Many of us were disappointed as much as our railroad friends were at the, to say the least, conservative report rendered by the Interstate Commerce Commission as to railroad rates. We were undoubtedly justified in believing that assistance of this character that could be rendered to the railroads would reflect upon our own industry. Many of the lines have recently put into effect schedules calling for some increase in passenger rates, and this has brought forth many protests. It would seem as though it were highly unjust for us to desire the successful running of railroads and yet to take umbrage when the rates really increase either on the freight or passenger traffic.

From the above you will note that your president feels that the members of our association can best serve the interests of the railroad business by fairly considering various propositions put forth and endeavoring to act upon them in a spirit of justice to the railroads and to ourselves.

VARIOUS MATTERS CONSIDERED

C. Wood Walter, chairman of the legislative committee, reviewed in a general way the year's

work of Congress regarding legislation affecting business. Stanley H. Bullard, chairman of the catalogue committee, made a report of what the committee has done in planning for the publication of a co-operative index of machine tools for distribution in foreign countries.

The convention papers were of high value and were listened to by large audiences. H. R. Eldridge, vice-president National City Bank of New York, gave a most illuminating talk on the operation of the proposed South American branches of his institution, which is reported elsewhere in this issue. James Logan, Worcester, Mass., made an instructive address on "A Closer Commercial Relation with Latin America." E. H. Fish, Worcester, Mass., gave an illustrated talk on "Reform in Drawings," which aroused a good deal of interest. Magnus W. Alexander, General Electric Company, Lynn, Mass., spoke on "Waste in Hiring and Discharging Men," which is elsewhere published in part in this issue.

A resolution was adopted commending the action of the National City Bank for its intention of establishing branch banks in South America. An expression of sympathy for the nations involved in the war took the form of a resolution.

The following resolution tells in vigorous fashion the attitude of the machine-tool trade as to railroad rate advances:

Whereas, All channels of trade in this country are suffering because the railroads are out of the market for materials; and whereas all business must pay a high price in the end for the neglect to sustain railroad credit and railroad activity, and since return of prosperity will find the carriers unprepared to handle the traffic and rushing improvements of this country in the midst of heavy tonnage at a high cost for everything the railroads must buy, including labor; and whereas railroad dividends are held down by regulation to a moderate level in good times; and whereas these dividends should be kept as stable as possible in bad times; and whereas a great body of shippers and receivers of freight have indicated a willingness to pay an increase in freight rates; and whereas increased income to the railroads would offset in great part a sacrifice of railroad securities at low prices, and thus tend to facilitate the ultimate restoration of a market for capital, which this debtor nation must again seek abroad as soon as European nations, upon whom we have been accustomed to rely for capital, shall have recuperated from the war; and whereas the country looks to the Interstate Commerce Commission as the body from which relief should come; and whereas the Interstate Commerce Commission in dealing with the 5 per cent. advance case, now pending before it, has the power and the obligation under law and court decision to sanction general rate advance explicitly on the ground that groups of railroads require larger income in order to support their credit; and whereas it would be a great misfortune if, in the midst of this greatest commercial exigency that this country has ever seen, should the commission take a change of view as to its powers and obligations; therefore, be it

Resolved, That we, the National Association of Machine Tool Builders, in convention assembled, advocate that the plea of the railroads be granted for both an increase in freight rates and in the cost of mileage books.

This resolution is adopted with the distinct understanding that the members of this association are shippers of freight, receivers of freight, and purchasers of mileage books, but believe that a fair income is necessary for the proper maintenance and repairs of railroads, for their proper extension and for the general prosperity of the whole country.

J. A. Massel, who has been commissioned by the Department of Commerce and Labor to investigate the market for machine tools in Latin-American countries, was present at the meetings, and many of the members took advantage of the opportunity to make his acquaintance and discuss his proposed work.

Machine Tool Dealers Meet

Following its custom, the Machinery Section of the National Supply and Machinery Dealers' Association held its annual meeting October 22 in rooms adjoining those in which the National Machine Tool Builders' Association met, in the Hotel Astor, New

York. O. P. Meckel, Baird Machinery Company, Pittsburgh, Pa., vice-president of the association, and by reason of that office in charge of its machinery interests, presided at the meeting, which was called to order by President Charles S. Farquhar, Chandler & Farquhar Company, Boston. The attendance was somewhat disappointing, but considered fair in view of recent trade conditions. Most of the meeting was devoted to informal discussion. The report of Thomas A. Fernley, secretary-treasurer of the association, touched upon most of the topics which were discussed. In part, he said:

SECRETARY-TREASURER FERNLEY'S REPORT

The past year in the affairs of the Machinery Section of this association has been one in which every effort has been made to indicate to legislators the manner in which certain proposed legislation would adversely affect the interests of our members. The tariff has been changed, but the general impression among our members appears to be that, even before the changed conditions on the other side of the Atlantic there was not any great effect on the domestic machine-tool business. The new conditions produced by the change have been nullified for the present by the cessation of manufacture on the other side.

The so-called anti-trust legislation has been of vital interest to our members, especially the legislation regarding exclusive selling arrangements. It is generally conceded that the foundation of the machine-tool merchandising business is laid on exclusive selling arrangements and that the dealer cannot be expected to promote actively the sale of tools of the various manufacturers unless he shall be given some assurance that he will reap the benefit of the work he has done and shall gain some reward for the money which has been expended. When the Clayton anti-trust bill was first introduced it created great alarm among the machine-tool dealers. In April we had a letter from C. Wood Walter, Cincinnati Milling Machine Company, saying that he was very glad to see that the dealers were busy killing the clause in the anti-trust bill, prohibiting exclusive selling arrangements. The bill, as then framed, would certainly have disrupted all arrangements existing between the machine-tool dealers and their agents.

The report then alluded to the efforts which had been put forth at Washington and elsewhere by the advisory secretary-treasurer, T. James Fernley, to avert the passage of unfair legislation and also to legal opinions which had been supplied to the members. One of these opinions set forth that exclusive selling arrangements are declared to be unlawful only when their effect may be to lessen competition substantially or to tend to create a monopoly in any line of commerce. Mr. Fernley also said:

The members have continued to use the uniform proposal blank in connection with quotations to their customers and it has been very helpful in minimizing some of the abuses which existed previous to the adoption of this form by machine-tool builders and the dealers.

The manufacturers have been supplied with the facts relative to the overhead expense accounts of their representatives, and the increasing inclination on the part of the former to recognize that it costs more than it formerly did to represent and distribute their tools is having good effect.

LEGAL EXPLANATION OF ANTI-TRUST BILL

The association was addressed by Felix H. Levy, New York, who was a special assistant attorney general in connection with some of the Government trust prosecutions. He explained the provisions of the Clayton anti-trust bill and in part, said:

It is evident that neither section 2 nor section 3 of the new law will have any effect upon the ordinary business transactions of ordinary business concerns as contrasted with trusts or intending trusts. The consensus of opinion in Congress as to the reason for these new provisions was that price discriminations and exclusive

selling arrangements were the favorite devices of trusts for driving out competitors, and accordingly Congress deemed it advisable to make each of these practices specifically unlawful, so that the victim of such practices would not be compelled to wait until an offending trust had consummated its purpose by crushing its competitors and gaining a monopoly, and thereby coming within the provisions of the Sherman law, but could immediately make complaint to the Federal Trade Commission and procure an order compelling such an offender to desist from such practice. In short, the purpose was to prevent the formation of a trust by forbidding these practices before a trust could consummate its purpose of gaining a monopoly.

Boston, Philadelphia, Pittsburgh, Cleveland, Salt Lake City and San Francisco were among the cities represented at the meeting.

Compensation in Massachusetts

The Industrial Accident Board of Massachusetts has issued a bulletin in which is presented a plan for organizing safety in places of employment in the state. It offers to prepare, on request, accident studies covering the experience of each employer who undertakes the organization of a safety committee. These studies will show the cost of injuries prior to the establishment of a safety committee. Later comparisons will indicate the percentage of reduction effected by such an organization. The board has a growing index of the most approved safety devices. This is at the disposal of the employers of the state for the purpose of assisting them in solving the many problems which will confront their safety organizations.

The details of the plan, as suggested to employers, follow very closely that which has been adopted by the United States Steel Corporation.

The Massachusetts Employees' Insurance Association, 84 State street, Boston, has issued the following table, which shows the increase in compensation benefits resulting from amendments passed by the last Legislature:

Compensation Benefits in Massachusetts Before and After October 1, 1914.

	Per cent. of weekly wages		Duration of payments, weeks		Maximum payments	
	Before	After	Before	After	Before	After
1. Total incapacity.....	50	66 2/3	500	500	\$3000	\$4000
2. Partial incapacity.....	50	66 2/3	300	500	3000	4000
3. Death—						
Dependents totally dependent.....	50	66 2/3	300	500	3000	4000
Partially dependent.....	50	66 2/3	300	500	3000	4000
No dependents.....					200	200
	(Expenses of last illness and burial)					
4. Specific injuries, calling for additional compensation—						
Loss of or loss of use of:						
(a) Both hands or Both feet, or One hand and one foot or the Sight of both eyes.....	50	66 2/3	100	100	1000	1000
(b) Either hand.....	50	66 2/3	50	50	500	500
Or the sight of one eye.....						
(c) Two or more fingers or toes at or above second joint.....	50	66 2/3	25	25	250	250
(d) Loss of at least one phalange of finger, thumb or toe.....	50	66 2/3	12	12	120	120
(e) Loss of use of one phalange of finger, thumb or toe.....	50	66 2/3	12	12	120	120
	None	66 2/3	None	12	...	120

*The percentages given are percentages of reduction in wages.

†The payments to partial dependents are that proportion of the payments to total dependents which the amount contributed to them by the deceased bears to his total earnings.

The Hess-Bright Mfg. Company, Philadelphia, Pa., announces that in spite of the European war and the temporary suspension of shipments from Germany, more than 125,000 assorted sizes of DWF bearings have been received from Berlin since September 1, 1914. Large quantities are still being received.

The Railroad Rate Rehearing

WASHINGTON, D. C., October 27, 1914.—The taking of evidence in the 5 per cent. rate advance case, taken up for rehearing October 19, was abruptly concluded October 23. The termination was marked by the complete collapse of the protestants under circumstances which argue strongly for an early decision favorable to the carriers. For four and a half days the attorneys for the carriers, by witnesses of national reputation, built up painstakingly before the commission the case of the petitioning railroads, creating a profound impression in the minds of all observers that the commission could not again ignore the carriers' plea for a small addition to their dwindling revenues.

When the case for the petitioners was rather unexpectedly closed on the fifth day of the hearing, it was quite generally believed that counsel for individual protestants, as well as for the shippers' associations, would request an assignment of time in which to present testimony in support of the contention that the same conditions that have increased the financial embarrassment of the railroads since the beginning of the European war have also placed additional burdens on manufacturers and consumers served by the roads. Considerable surprise was created, therefore, when Clifford Thorne, counsel for a large number of shippers and for several Western State railroad commissions, announced that the protestants would not place any witnesses on the stand, but would content themselves with submitting a brief general statement, which Mr. Thorne then proceeded to make.

The completion of the testimony was followed by an announcement by Acting Chairman Clements that argument in the case would begin next Thursday, October 29. It is expected that the attorneys for the carriers will occupy not to exceed two days and that counsel for the shippers will consume but a few hours. Whether time will be requested in which to file additional briefs cannot now be stated, but there is every indication that the case will be in the commission's hands within the next 10 days. While all precedents indicate that the commission will devote at least 60 days to the consideration of this controversy, the importance of which overshadows any litigation before the commission since it was organized, yet it would not be surprising if these precedents should all be demolished and the final verdict rendered before the end of November.

The case for the railroads has been conducted on rehearing with extraordinary skill. Being debarred by the terms of the commission's order in reopening the case from the privilege of showing the fallacies in the adverse decision of the commission upon the original petition, counsel for the carriers found themselves limited both in evidence and argument to facts which have developed since the petition was denied. This limitation was necessarily embarrassing, but the showing made on the rehearing serves to emphasize not only the skill with which the case has been handled but the substantial equities underlying the carriers' contentions.

Convincing testimony indicating the plight in which the railroads will find themselves at the end of the European war, if they do not secure an increase in income, was given by Charles A. Conant, of New York, a well-known financial expert. When the war ends, said Mr. Conant, or even sooner if it is prolonged many months, the belligerent countries will be obliged to float enormous loans to repair the damages of war, and with depleted treasures and neglected industries will be called upon to pay unusually high rates of interest. This demand for capital will be felt in every money market of the world, and any railroad attempting to secure funds with which to make extensions or improvements will be called upon to meet the extraordinary competition of the great nations of the world "eagerly seeking billions of dollars and willing to pay a high price for the accommodation."

Louis Brandeis, special counsel for the commission, whose attitude of hostility toward the carriers was one of the leading features of the original case, interposed in the hearing a suggestion that a radical revision of all rates, such as was recently undertaken in New England, would be necessary to provide adequate relief

for the railroads. Clifford Thorne interjected the statement that the State bodies would not oppose the increase of any inadequate intrastate rates, but he asserted that the railroads had not presented a convincing case to the commission and especially had failed to show that their condition was the cause of the existing depression, which, he asserted, was world-wide even before the beginning of the European war.

Much favorable comment has been heard here upon the course of the protestants in the original case, and the iron and steel producers in particular, in refraining from taking an aggressive stand against the proposed advance at this time. This course, however, undoubtedly reflects a commendable form of "enlightened self-interest," for the prosperity of the railroads is vital to the welfare of all industries.

W. L. C.

Bill to Reform Consular Service

WASHINGTON, D. C., October 27, 1914.—A comprehensive reform in the consular service, of much importance to manufacturers and exporters seeking to extend their foreign trade, is provided in a bill just passed by the Senate on the urgent recommendation of the President and Secretary of State.

Under existing law, consuls general, consuls and secretaries of embassies and legations are appointed by the President to particular posts and are confirmed by the Senate, and whenever it is desired to transfer an officer it is necessary that he be reappointed and confirmed by the Senate in his new place. By the bill as passed, the appointments will be made to the service at large, and not to any particular post, and the Secretary of State and the President will thus be enabled to make assignments and transfers promptly to meet emergencies as they arise. This element of elasticity in the consular service is regarded as highly important in the interest of our export trade, as it will enable the State Department to transfer consular officials from post to post to familiarize them thoroughly with the trade requirements of the leading foreign countries and to secure the widest possible experience in what is regarded as the most important function of the consular service, namely, the extension of the foreign commerce of the United States. Another change effected by the bill in this same connection permits the Secretary of State to detail a consular official for special duty in the United States or abroad in attendance upon international gatherings, congresses or conferences, or in pursuit of special investigations of importance to the business men of the United States.

The extremely small salaries paid to all consular officials have constituted a serious bar to the organization of the service on a sound business basis and it has been difficult to secure the services of men of ability even though appointments for some time past have been strictly on a merit basis and without regard to political influence. Under the bill as passed by the Senate the salaries of the consular service are judiciously increased.

From time to time rumors have reached the State Department that certain members of the diplomatic service have been financially interested in the import or export trade of countries to which they were accredited. To meet this situation the bill provides:

No ambassador, minister, minister resident, diplomatic agent, or secretary in the diplomatic service of any grade or class shall, while he holds office, be interested in or transact any business as a merchant, factor, broker, or other trader, or as an agent for any such person to, from, or within the country or countries to which he or the chief of his mission, as the case may be, is accredited, either in his own name or in the name or through the agency of any other person, nor shall he, in such country or countries, practice as a lawyer for compensation or be interested in the fees of compensation of any lawyer so practicing.

In view of the interest of the President and the Secretary of State in this measure, it is altogether probable that it will be passed by the House when Congress reconvenes in December. Its enactment will be of special importance to the State Department because of the co-operation which it facilitates between the consular service and the recently appointed commercial attaches.

W. L. C.

ESTABLISHED 1855

THE IRON AGE

Published Every Thursday by the DAVID WILLIAMS CO., 239 West Thirty-ninth Street, New York

W. H. Taylor, *Pres. and Treas.*

Charles G. Phillips, *Vice-Pres.*

Fritz J. Frank, *Secretary*

M. C. Robbins, *Gen. Mgr.*

BRANCH OFFICES—Chicago: Otis Building. Pittsburgh: Park Building. Boston: Equitable Building. Philadelphia: Real Estate Trust Building. Cleveland: New England Building. Cincinnati: Mercantile Library Building.

Subscription Price: United States and Mexico, \$5.00 per year; to Canada, \$7.50 per year; to other foreign countries, \$10.00 per year. Entered at the New York Post Office as Second-class Mail Matter.

EDITORS

GEO. W. COPE

A. L. FINDLEY

W. W. MACON

CHARLES S. BAUR, *Advertising Manager*

Our Foreign Trade Situation

Connecting the proper cause and effect has been a matter of great difficulty in the chaotic condition of international trade in the past three months. The effort to give quick relief, whether through government agency or through co-operative action of manufacturers, has caused the taking of some steps which were expected to do much more for exports from the United States than has actually resulted. President Farrell, in his address before the American Manufacturers' Export Association in New York last week, called attention to the fact that there are now more ships than cargoes to the open ports of the world and that our trade is not halted through lack of transportation. The point of this statement is that at present other considerations than shipping facilities dominate the foreign trade situation, making it certain that for some time we must be content with a much smaller export movement than was prophesied ten weeks ago as an early and necessary result of the war.

Whereas the acts of Congress bringing foreign-built ships under American registry and creating a government bureau of war risk insurance did relieve to some extent the trade blockade of early August, time enough has elapsed to show that other causes, largely financial, were chiefly responsible for the restriction of manufactured exports. These causes are beyond the reach of Congressional enactments and will require time both for the handling of the home situation and for the working out of problems of the warring nations, on which to-day there is scarcely a ray of light.

With the country given over, as in the past few years, to the belief that legislation contained the remedy for practically every untoward economic condition, it is not surprising that expectations of the shipping act rose far too high. The transfer to American registry of 77 foreign-built vessels with a tonnage of 275,000 is scarcely a beginning, in view of the 2,500,000 tons of vessel capacity owned by Americans but flying foreign flags. The revision of our navigation laws must extend to the removal of the heavy handicap in the expense of operating American vessels before our flag will take the place it must hold if the dreams of foreign trade, that have so readily passed for accomplished fact in these weeks of national awakening, are to be realized.

Another matter to which increasing attention will be given in the development of export plans, Mr. Farrell refers to in these words:

As long as it concerns only a comparatively small number of large interests, foreign trade will never be the object of national solicitude. Probably the most important committee of the Foreign Trade Council is that on methods by which the smaller manufacturers can more economically and effectively enter foreign markets. The reduction of unnecessary expenses of representation and elimination of useless efforts are imperative if they are to succeed.

Competing manufacturers of chemicals have already brought before the Department of Commerce a proposal to unite their forces in organizing for foreign trade. What independent steel companies propose in the same direction has been frequently referred to in these columns. Now that a Federal Trade Commission has been provided for, the machinery exists for such supervision of united effort in export trade as should keep it free from government attack as in violation of the Sherman act.

The Steel Corporation Suit

The suit for the dissolution of the United States Steel Corporation, now rapidly approaching a court decision, has been in progress for three years. So vast are the interests involved and so complicated are the various questions raised that it was necessary to occupy so long a period in the taking of testimony and the preparation of the briefs of both sides. At the time the suit was instituted it was the general belief that several years would be required for the preliminary work and this expectation has been fully borne out. The United States Circuit Court at Philadelphia is now hearing the oral arguments in the case and a decision by that court may be expected within the next few weeks. It is not likely that either party will abide by the decision of this court. If the suit is decided adversely to the Steel Corporation the case will undoubtedly be carried to the Supreme Court, while if decided favorably it may be confidently expected that the attorneys for the Government will not permit the matter to rest, but will ask for the judgment of the higher court. The decision by the Circuit Court, however, will mark the arrival at an important point in the proceedings.

To the disinterested and non-legal mind a decision in favor of the dissolution of the corporation does not seem to be warranted by the evidence presented or the arguments which have been brought forth by the counsel for the Government. No substantial facts have been produced to show that the

management of the corporation has been guilty of illegal acts since its formation. No evidence has been presented that it has been guilty of any action tending to restrain trade or create a monopoly. The attorneys for the Government have sought by inference to show that the corporation has influenced the maintenance of prices, but nothing has been brought out to show that any agreements were ever entered into with competitors or that any attempt has been made to compel competitors to maintain prices on the same level as the corporation. It has been shown that certain pools in minor products which had existed at the formation of the corporation, and which included in their membership some of its subsidiaries, were dissolved as soon as the matter was brought to the attention of Chairman Gary, and since then competition has been absolutely free and unrestrained in every branch of trade in which it participates.

An order to dissolve the corporation, if it should be found that its formation constituted a violation of the Sherman anti-trust act, would not seem to be warranted at this time. So many years have elapsed, such complications of interests have grown up, such a vast financial fabric has been built and the securities of the corporation have been so widely distributed among not only the citizens of this country but abroad that it may well be questioned whether such action should be precipitated. To do so would not punish those responsible for the formation of the corporation as they are not now the sole or even principal owners of its securities. The punishment would be inflicted upon thousands of persons in nowise responsible for this action and who became the owners of such securities in the belief that so long a time had elapsed that the Government had virtually sanctioned it. Instead of an order for dissolution, it would seem that if any punishment was to be inflicted it should be visited upon the individuals responsible for the consolidation. The Sherman act provides personal penalties and does not necessarily contemplate the destruction of property values. And yet it does not seem clear to the non-legal mind that at this late day, if there is any force in the statute of limitations when labor leaders are not involved, personal penalties can be imposed.

The attorneys for the Government have made much of the Gary dinners. In the course of taking testimony and in their brief and their oral arguments they have dwelt largely upon the facts in connection with these dinners. Every effort has been made to show that Chairman Gary of the United States Steel Corporation brought about these dinners immediately after the panic of 1907 for the purpose of maintaining prices and that in this way the spirit of the Sherman act was violated. Looking back upon the demoralized condition of business at that time, it does not seem that the country was otherwise than benefited by the closer relationship into which the iron and steel manufacturers were thus brought. Credit must be given to Chairman Gary for the admirable manner in which every care was taken to avoid illegal acts and yet at the same time secure such harmony among iron and steel manufacturers that a disastrous break in prices was avoided, with almost inevitable financial ruin to many in-

terests and a serious prolongation of panic conditions. We have at various times seen much more flagrant attempts at checking the downward course of prices of such staples as cotton, tobacco and other natural products which have brought about no effort by Government authorities for the punishment of those who were most active in such proceedings. We have an instance of this kind in the present movement to establish a higher price for cotton than would prevail in a natural market, and not only are no steps being taken toward punishing anybody but bold attempts are being made to have the Government back the cotton planters in efforts to bolster prices. To punish the United States Steel Corporation for merely using its influence in steadyng a market in time of a panic would seem, therefore, to be the height of inconsistency.

British Iron Trade Conditions

The quarterly report of the Iron and Coal Trades Review, London, indicates that in the United Kingdom there was an average of 292 furnaces in blast in the quarter ended June 30, 290 actually in blast on that date, an average of 281 in blast in the quarter ended September 30 and 286 in blast on September 30. From these figures it is evident that there have been no great changes in the rate of pig iron production in Great Britain, but it is to be inferred that there was a material decrease for a short time in the July-September quarter, presumably in August, and that there has lately been a slight increasing tendency, the present rate being but little below that of June 30.

In our own case, we had a slight rise in pig iron production in August, instead of a decline, but we are now making pig iron at a considerably lower rate than on June 30, our monthly reports having shown 63,698 tons daily of active capacity for July 1, and 60,427 tons for October 1, a decrease of 5.1 per cent., while the British rate appears to have decreased only 1.4 per cent., and our rate is now decreasing rather sharply while it is not certain that the British rate is decreasing at all.

The movement in iron and steel prices in England has been in the same direction as the movement in the United States. At the beginning of the war prices advanced quite sharply, while of late the tendency has been a declining one. Comparing present British prices with those given in our cable of July 29, pig iron is down, Cleveland warrants by 1s. 7½d., and the maker's price of No. 3 Cleveland iron by 1s. 9d., while steel prices are up. Rails show a net advance of 10s., Scotch ship plates, £1 7s. 6d.; beams, £1; bars, £1 5s.; black sheets, 7s., all per ton of 2240 pounds, and tin plates 6d. per box. Welsh sheet bars are up 12s. 6d. per ton. The net advances in finished steel products are very considerable, averaging perhaps not far from \$5 a ton, while the maximum advances in the United States were much less and the major portion of the advances has already been lost.

On the whole, the state of general trade in Great Britain appears to be considerably better than in the United States. There is depression, but not so great as obtains here. Occasionally a disposition is shown to credit this divergence to greater activity and more systematic effort on the

part of the British, and particularly on the part of the government, than has obtained in the United States. A glowing account appeared quite recently in an American trade journal of the orderly and systematic manner in which British government agencies were cataloguing and indexing German export business "at the rate of three trades a day" and much to the same effect. This brought out a prompt rejoinder from our London contemporary already quoted, substantially to the effect that while the editor wished it was true, the picture gave "too rosy a view of our own activities." There is reason to conclude rather that such difference in trade activity as may exist is due wholly to the fact that as England is actually at war the war expenditures are very large. Indeed, in the United States we find considerable special activity due to the war and in England there is naturally vastly more.

As was pointed out in these columns a week ago, in discussing British iron and steel exports in September, the month showed a gain in tonnage of 8 per cent. over August, August exports having been 58 per cent. of the July exports, while September exports were 63 per cent. The trade, however, was very largely with the colonies. When South America and other neutral countries begin buying more freely there is good reason to hope that the United States will profit proportionately as greatly by the increase as will be the case with England. We are in position to produce at the same cost as formerly and may be able to reduce our costs somewhat, while there does not seem to be any possibility of England producing more cheaply next year than just before the war.

May Smelt Bolivian Tin Here

Through R. M. Atwater, Jr., a proposition having for its purpose the establishment of a tin smelter on the Atlantic seaboard to utilize the tin ores which Bolivia produces, has been submitted to the government of that country. The proposal is also in the hands of Secretary William C. Redfield, Department of Commerce, and it is expected that in due time the matter will be taken up by the diplomatic agents of the two countries. Government action is necessary inasmuch as the smelter would be owned by the Bolivian government through the trustee stock of a United States corporation. Its actual operation would be in the hands of citizens of this country under the supervision of Bolivians.

Though the actual profit of smelting, after redemption of the plant, would accrue to the Bolivians, the cost of operating, labor and supplies, amounting to \$500,000 per annum, according to estimates, as well as the selling commission, will stay in the United States. Of greater importance, however, would be the establishment of a commerce with Bolivia, which would be likely to exceed \$25,000,000 per year, Bolivia taking our manufactured goods.

Following are some of the facts which have been presented to the Department of Commerce: Bolivia produces about 25 per cent. of the world's tin supply but consumes none, while the United States consumes about 40 per cent. of the world's total production but produces none. The Bolivian ores are not smelted at home because of the prohibitive cost of fuel, but are shipped to Europe, where they are reduced to metal. The only other important tin producing country is Malaysia, which turns out about 60 per cent. of the world's supply, all smelted at home but marketed through London. The United States, notwithstanding its being the largest buyer, is in the worst position, inasmuch as, in addition

to the London price, it has to pay the ocean freight to New York.

When the war broke out, the buyers of Bolivian ores withdrew from the market and created, in the judgment of experts, an opportunity for the United States to secure at least partial freedom from European sources of supply. With the cessation of shipments from Bolivia, the miners found themselves without means to operate their properties and the Bolivian government temporarily lost the revenue it derived from the tin export duty. At this time, Mr. Atwater conceived the idea that the Bolivians should build a plant in this country, their nearest market, where fuel is cheap and the demand great enough to take their entire product. The opening of the Panama Canal added to the logic of the proposition. The plan provides that Bolivia shall assure to the contemplated smelter a steady supply of ore by a discreet use of its export duty, refunding it, in whole or in part, to those who send their ores to the government plant.

Virginia Iron, Coal and Coke Report

The Virginia Iron, Coal & Coke Company has issued its report for the year ended June 30, 1914, which gives the income account as follows, compared with the preceding year:

	1913-14	1912-13
Gross receipts	\$4,262,508	\$4,331,563
Expenses	3,774,097	3,749,133
Net earnings	\$488,410	\$581,836
Other income	23,700	35,087
Total income	\$512,110	\$616,897
Charges, taxes, depreciation, development, etc.	629,716	654,988
Deficit	\$117,606	\$37,091

Operating accounts were charged during the year with the following amounts for depreciation funds: Coal lands, \$120,729; ore lands, \$4066; improvements to owned properties, \$171,108; improvements to leased properties, \$53,729; quarries, \$103; furnace repairs, \$31,985; total, \$381,722.

The following amounts were expended for additions and improvements to properties: Owned properties, \$179,571; leased properties, \$32,022; furnace repairs, \$20,765; total, \$232,359.

The general balance sheet as of June 30, 1914, compares as follows:

	Assets	Liabilities
Real estate	1913-14 \$12,420,405	1912-13 \$12,595,009
Equipment	476,738	411,147
Securities owned	197,363	197,363
Ledger balance	371,541	789,894
Open accounts	61,235	67,681
Bills receivable	82,055	104,142
Advance to cashier, etc.	4,912	4,995
Cash on hand	50,301	57,346
Material on hand	2,170,199	1,753,755
Profit and loss deficit	1,378,516	1,229,804
Total	\$17,213,269	\$17,191,136
Capital stock	\$10,000,000	\$10,000,000
Bonds	5,171,000	5,233,000
Unpaid vouchers and payrolls	304,167	340,938
Bills and accounts payable	1,672,364	1,531,906
Interest and taxes	84,516	85,292
Depreciation funds, etc.	11,220	.....
Total	\$17,213,269	\$17,191,136

President John B. Newton says in part: "The general depression in business throughout the country the past year is reflected in the statement of business done by the company, so far as pig-iron manufacture is concerned. In spite of the business depression, the coal-mining department of the company has shown steady growth, with very satisfactory results. At the beginning of the fiscal year the stock of pig iron on hand amounted to 59,564 tons. During the year the furnaces produced 127,941 tons, but the demand for pig iron was so limited, and the prices offered so low, that the company was not justified in shipping but 103,310 tons. The stock of pig iron, therefore, has increased 24,631 tons. The energy of the management has been directed constantly toward a reduction in the cost of manufacturing pig iron, and with this end in view it decided to expend in the neighborhood of \$100,000 in new equipment at the Roanoke furnaces."

STEEL CORPORATION EARNINGS

Surplus for September Quarter \$89,479

The United States Steel Corporation has issued its statement of earnings, covering its subsidiary companies, for the quarter ended September 30, 1914. It compares as follows with the corresponding quarter of 1913:

	1914	1913
July earnings	\$7,475,993	\$12,936,658
August earnings	7,584,926	12,657,430
September earnings	7,215,083	12,856,312
Total earnings after deducting all expenses incident to operations, including those for ordinary repairs and maintenance of plants and interest on bonds of subsidiary companies	\$22,276,002	\$38,450,400
Less charges and allowances for depreciation, viz.:		
Sinking funds on bonds of subsidiary companies and depreciation and extraordinary replacement funds	6,017,922	7,130,959
Sinking funds on U. S. Steel Corporation bonds	1,576,058	1,697,255
Net income	\$14,682,022	\$29,622,186
Deduct interest for the quarter on U. S. Steel Corporation bonds outstanding and premium payable on bonds redeemable under sinking funds	5,746,111	5,614,708
Balance	\$8,935,911	\$24,007,478
Dividends for the quarter on stocks of the U. S. Steel Corporation, viz.:		
Preferred	6,304,919	6,304,919
Common	2,541,513	6,353,781
Surplus for the quarter	\$89,479	\$11,348,778

It will be observed that the quarterly dividend on the common stock has been reduced from $1\frac{1}{4}$ to $\frac{1}{2}$ of 1 per cent., thus effecting an important saving and enabling a surplus to be added to the previous surplus. The dividends of $1\frac{1}{4}$ per cent. for each of the previous three quarters had taken a total of \$12,451,185 from the surplus.

The earnings for the quarter ended June 30, 1914, were \$20,457,596, and for the quarter ended March 31, 1914, there were \$17,994,381. The third quarter shows a gain over the second quarter of \$1,818,406.

The total earnings for the nine months ended September 30, 1914, were \$60,727,979, and the deficit for that period was \$11,359,402, against total earnings of \$114,097,014 and a surplus, after the payment of dividends, of \$32,337,743 for the nine months ended September 30, 1913.

The United States Non-Condensing Boiler Company, 517 Marine Bank Building, Erie, Pa., has been incorporated with a capital stock of \$50,000 by Merit Owen and Walter A. Moffat, Erie, and David Brash, Ashtabula, Ohio, to manufacture a patented boiler appliance. The apparatus will be made for the company under contract for the present. H. S. Pell, Sr., for many years connected with the Stirling Boiler Company, is consulting engineer.

The Northwestern Iron Company, Colby-Abbot Building, Milwaukee, Wis., has filed an amendment to its corporate articles to provide for an increase in capital from \$2,500,000 to \$3,000,000. Armin A. Schlesinger, vice-president and treasurer, states the increase is to cover the recent improvements made at the company's plant, at Mayville, Wis., including the establishment of coke works to supply the blast furnaces.

The Algoma Steel Corporation, Ltd., Sault Ste. Marie, Canada, owing to general conditions, was unable to meet the interest due October 1 on the \$14,000,000 first and refunding mortgage bonds. It is probable that the coupons for some period will be funded. A committee has been formed in London to represent these bonds.

The Philadelphia office of the Lackawanna Steel Company, William Breeden, manager, will be removed November 1 from suite 511 in the Morris Building to suite 803, which will afford more commodious quarters.

CONTENTS

The Evolution of the Car Dumper	985
New Dial Feed Attachment for Presses	987
Railroad Buying and National Prosperity	988
Heavy Beading Machine for Sheet Metal	990
A Single-Stage Rotary Air Compressor	991
The Southern Iron and Steel Industry	992
Birmingham Furnace Practice Development	994
Improved Heavy Power Bending Brake	996
Automatic Bolt Head Trimming Machine	997
An Inserted Tooth Slab Milling Cutter	997
Larger Demand for Lighting Carbons	997
The Turbo-Blower for the Blast Furnace	998
Head for Long Lathe Boring Bar	1003
Hydraulic Broaching and Forging Press	1004
Test of a Taper Roller Bearing	1004
Machine Tool Convention	1005
Compensation in Massachusetts	1006
The Railroad Rate Rehearing	1007
Bill to Reform Consular Service	1007
Our Foreign Trade Situation	1008
The Steel Corporation Suit	1008
British Iron Trade Conditions	1009
May Smelt Bolivian Tin Here	1010
Virginia Iron, Coal and Coke Report	1010
Steel Corporation Earnings	1011
Receiver for R. D. Wood & Co.	1011
The Iron and Metal Markets	1012
The Steel Corporation Suit	1024
Moose Mountain Iron Ores of Canada	1025
Electric Drive in an English Sheet Mill	1025
United States Banks in South America	1026
Management Society Meeting	1029
Correspondence	1030
Programme of National Founders' Meeting	1031
Waste in Hiring and Discharging Men	1032
Trade with Russia Should Be Developed	1034
The War and Foreign Trade	1035
Personal	1036
Pittsburgh and Nearby Districts	1036
Obituary	1037
The Machinery Markets	1038

Receiver for R. D. Wood & Co.

Mention was made last week that proceedings were pending which were expected to result in the appointment of a receiver for R. D. Wood & Co., Philadelphia, manufacturers of cast-iron pipe, hydraulic machinery and gas-making apparatus. The proceedings were brought about by the application of executors of the estate of the late Stuart Wood in an effort to oust his brother, Walter Wood, as surviving and liquidating partner of the firm. It was asserted that the interests of Walter Wood as president of the Camden Iron Works and Florence Iron Works, New Jersey corporations, are apart from those of the estate of Stuart Wood in R. D. Wood & Co. and irreconcilable to the co-operation necessary to enhance the value of the assets of the firm. Walter Wood was named as receiver and the Common Pleas Court in Philadelphia decided that the appointment of a co-receiver would be the best procedure and named M. Hampton Todd to act in that capacity. Proceedings instituted in New Jersey resulted in the appointment of Haulings Lippincott as receiver of the Camden Iron Works and Harold Wells receiver of the Florence Iron Works. Regarding the two companies named, it is stated that this action was taken by Walter Wood for the purpose of protecting all parties in interest and as a result of equity proceedings of the firm of R. D. Wood & Co. in liquidation.

The production of copper in Japan has been increasing for many years. In 1913 the output was 3410 metric tons above the previous record of 61,471 tons in 1912. The value of the production in 1912 was \$20,045,526 and in 1913, \$20,716,800. Most of the ore is smelted at the mines. Exports in 1912 and 1913 were valued at less than \$1000.

The Iron and Metal Markets

STEEL OUTLOOK NOT BRIGHT

Mill Operations Still Shrinking

Prices Lower on Various Products

The winter prospect for the steel trade is not encouraging. Other years have usually seen back logs in the shape of contracts for steel rails, structural steel and other staple products affording some basis for steadiness in steel-works operations. Mill books are almost bare of such business at this time. Current orders now represent but a fraction of the capacity of mills. It will be necessary to go back a number of years to find a time when steel companies had a smaller tonnage of railroad business than at present. Under these circumstances it is noteworthy that the Pennsylvania Steel Company has received an order from the Southern Railway for 4400 tons of rails, the purchase being made with money that had been appropriated for other purposes. The general rate of steel-mill operations at Pittsburgh is only 40 to 45 per cent. of capacity, while the Chicago mills are likely to drop to 30 per cent. this week. For part of the week no Chicago plate mills will be in operation.

Prices are giving way. Billets, sheet bars and wire rods are off 50 cents per ton, steel plates and sheets \$1 per ton and tin plates \$2 per ton. Lower than 1 cent per pound, Chicago, has been done on bar iron.

Pig-iron makers are no longer expecting higher prices, as they are showing more willingness to book orders for deliveries extending into next year at the best prices they are able to obtain. This has led to some increase in business in a few of the leading pig-iron markets. An important development is the entrance into the foundry iron market of steel companies in the Chicago district. They are not using their current make of pig iron and are turning to the foundry trade, although that branch of business is at present so depressed that many of the merchant furnaces in the district are out of blast. This has had the natural effect of weakening local pig-iron prices.

Throughout the country generally the effort to secure pig-iron business has led to a reduction of about 25 cents per ton, except in Alabama, where the producers are apparently making a stand at \$10 for No. 2 foundry, even though stocks in their yards are rapidly accumulating. Bessemer and basic pig iron have declined 25 cents in the Pittsburgh district.

The Ohio railroads have advanced their freight rates on pig iron 5 per cent., making the rate from the Mahoning Valley to Cleveland 95 cents per ton against the old rate of 90 cents.

The closing of contracts for 8700 tons of structural steel in this locality is somewhat encouraging, while Cleveland also reports some good structural contracts. Chicago, however, notes that seldom has that center offered less of interest in this branch of business than now.

Definite figures are now available with regard to the sensational purchases of American machine tools by Europe. At least 1700 engine lathes have been bought in the past fortnight, while turret lathes, automatics and grinding machines have been taken in good quantity. Even Germany has bought some machine tools here. Inquiries for a large number of other machine tools, including about 1000 lathes, are in hand, promising to develop into orders. This increase in business has greatly improved the tone of this branch of trade and the domestic demand is beginning to revive. Some machine-tool makers are now working double time.

It is estimated that not less than 50,000 tons of barb wire has been shipped abroad since the European war broke out. The merchant pipe trade is somewhat improved, October making a better showing in point of business booked than September. An order has been placed for about 60 miles of line pipe to be used in Texas, this being the first good line pipe order for some time.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type Declines in Italics

At date, one week, one month, and one year previous.

Oct. 28, Oct. 21, Sept. 30, Oct. 29,

Pig Iron, Per Gross Ton :	1914.	1914.	1914.	1913.
No. 2 X, Philadelphia...	\$14.50	\$14.50	\$14.75	\$15.75
No. 2, Valley furnace...	12.75	12.75	13.00	13.75
No. 2, Southern, Cin'ti...	12.90	12.90	13.25	14.25
No. 2, Birmingham, Ala...	10.00	10.00	10.00	11.00
No. 2, furnace, Chicago*	12.75	13.00	13.00	15.00
Basic, del'd, eastern Pa...	14.00	14.00	14.00	15.25
Basic, Valley furnace...	12.50	12.75	13.00	13.75
Bessemer, Pittsburgh...	14.65	14.90	14.90	16.40
Malleable Bess., Ch'go*	13.00	13.00	13.00	15.00
Gray forge, Pittsburgh...	13.40	13.40	13.65	14.30
L. S. charcoal, Chicago...	15.75	15.75	15.75	15.25

Billets, etc., Per Gross Ton :

Bess. billets, Pittsburgh...	19.50	20.00	21.00	22.50
O-h. billets, Pittsburgh...	19.50	20.00	21.00	22.50
O-h. sheet bars, P'gh...	20.00	20.50	22.00	23.00
Forging billets, base, P'gh...	25.00	25.00	26.00	26.00
O-h. billets, Phila....	22.40	22.40	23.40	24.00
Wire rods, Pittsburgh...	25.50	26.00	26.00	26.50

Old Material, Per Gross Ton :

Iron rails, Chicago...	11.00	11.00	11.25	13.50
Iron rails, Philadelphia...	13.00	13.00	14.00	17.50
Carwheels, Chicago....	10.50	10.50	10.75	12.00
Heavy steel scrap, P'gh...	10.50	10.75	11.00	11.50
Heavy steel scrap, Phila...	9.50	9.50	10.50	11.00
Heavy steel scrap, Ch'go	8.50	8.50	8.50	10.00
No. 1 cast, Pittsburgh...	11.50	11.50	11.50	12.00
No. 1 cast, Philadelphia...	11.00	11.00	12.00	13.50
No. 1 cast, Ch'go (net ton)	9.00	9.00	9.00	10.25

Finished Iron and Steel,

Per Lb.to Large Buyers :	Cents.	Cents.	Cents.	Cents.
Bess. rails, heavy, at mill	1.25	1.25	1.25	1.25
Iron bars, Philadelphia...	1.12	1.12	1.12	1.32 $\frac{1}{2}$
Iron bars, Pittsburgh....	1.15	1.15	1.15	1.50
Iron bars, Chicago....	0.97 $\frac{1}{2}$	1.00	1.05	1.15
Steel bars, Pittsburgh...	1.15	1.15	1.20	1.35
Steel bars, New York...	1.31	1.31	1.36	1.51
Tank plates, Pittsburgh...	1.10	1.15	1.20	1.30
Tank plates, New York...	1.26	1.31	1.31	1.46
Beams, etc., Pittsburgh...	1.15	1.15	1.20	1.30
Beams, etc., New York...	1.31	1.31	1.36	1.46
Skelp, grooved steel, P'gh	1.15	1.15	1.15	1.30
Skelp, sheared steel, P'gh	1.20	1.20	1.20	1.35
Steel hoops, Pittsburgh...	1.25	1.25	1.30	1.50

Sheets, Nails and Wire,

Per Lb.to Large Buyers :	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, P'gh	1.90	1.95	1.95	2.00
Galv. sheets, No. 28, P'gh	2.90	2.95	2.95	3.00
Wire nails, Pittsburgh...	1.60	1.60	1.60	1.60
Cut nails, Pittsburgh...	1.60	1.60	1.60	1.55
Fence wire, base, P'gh...	1.40	1.40	1.40	1.40
Barb wire, galv., P'gh...	2.00	2.00	2.00	2.00

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Coke, Connellsville,

	Oct. 28	Oct. 21	Sept. 30	Oct. 29
Per Net Ton at Oven:	1914.	1914.	1914.	1913.
Furnace coke, prompt...	\$1.60	\$1.60	\$1.60	\$2.00
Furnace coke, future...	1.75	1.75	1.75	2.10
Foundry coke, prompt...	2.00	2.00	2.00	2.75
Foundry coke, future...	2.15	2.15	2.15	3.00

Metals,

Per Lb.	Large Buyers:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York.	11.50	11.50	12.25	16.87	12
Electrolytic copper, N. Y.	11.25	11.25	11.75	16.62	12
Spelter, St. Louis.	4.95	4.85	5.00	5.30	
Spelter, New York.	5.10	5.00	5.15	5.45	
Lead, St. Louis.	3.37	3.25	3.35	3.57	12
Lead, New York.	3.50	3.50	3.75	4.35	
Tin, New York.	30.75	29.00	30.87	40.10	
Antimony, Hallett's, N. Y.	15.00	13.00	10.00	7.25	
Tim plate, 100-lb. box, F'g'h.	\$3.15	\$3.25	\$3.30	\$3.50	

Finished Iron and Steel f. o. b. Pittsburgh

Freight rates from Pittsburgh, in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Louis, 22 1/2c.; Kansas City, 42 1/2c.; Omaha, 42 1/2c.; St. Paul, 32c.; Denver, 84 1/2c.; New Orleans, 30c.; Birmingham, Ala., 45c.; Pacific coast, 80c. on plates, structural shapes and sheets No. 11 and heavier; 85c. on sheets Nos. 12 to 16; 95c. on sheets No. 16 and lighter; 65c. on wrought pipe and boiler tubes. The foregoing rates to the Pacific coast are by rail. The rate via New York and the Panama Canal on plates, shapes, etc., is 46c.

Plates.—Tank plates, 1/4 in. thick, 6 1/4 in. up to 100 in. wide, 1.10c., base, net cash, 30 days. Following are stipulations prescribed by manufacturers with extras:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, 1/4 in. and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per sq. ft., are considered 1/4-in. plates. Plates over 72 in. wide must be ordered 5/8 in. thick on edge, or not less than 11 lb. per sq. ft., to take base price. Plates over 72 in. wide ordered less than 11 lb. per sq. ft. down to the weight of 3-16 in. take the price of 3-16 in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Extras	Cents per lb.
Gauges under 1/4 in. to and including 3-16 in.	10
Gauges under 3-16 in. to and including No. 8.	15
Gauges under No. 8 to and including No. 9.	25
Gauges under No. 9 to and including No. 10.	30
Gauges under No. 10 to and including No. 12.	40
Sketches (including straight taper plates), 3 ft. and over	10
Complete circles 3 ft. in diameter and over	20
Boiler and flange steel	10
"A. B. M. A." and ordinary firebox steel	20
Still bottom steel	30
Marine steel	40
Locomotive firebox steel	50
Widths over 100 in. up to 110 in., inclusive	5
Widths over 110 in. up to 115 in., inclusive	10
Widths over 115 in. up to 120 in., inclusive	15
Widths over 120 in. up to 125 in., inclusive	25
Widths over 125 in. up to 130 in., inclusive	50
Widths over 130 in.	100
Cutting to lengths, under 3 ft. to 2 ft. inclusive	25
Cutting to lengths, under 2 ft. to 1 ft. inclusive	50
Cutting to lengths, under 1 ft.	1.55
No charge for cutting rectangular plates to lengths 3 ft. and over.	

Structural Material.—I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in. on one or both legs, 1/4 in. thick and over, and zees, 3 in. and over, 1.15c. Extras on other shapes and sizes are as follows:

	Cents per lb.
I-beams over 15 in.	10
H-beams over 18 in.	10
Angles over 6 in., on one or both legs.	10
Angles, 3 in. on one or both legs, less than 1/4 in. thick, as per steel bar card, Sept. 1, 1909.	70
Tees, structural sizes (except elevator, handrail, car truck and conductor rail).	.05
Channels and tees, under 3 in. wide, as per steel bar card, Sept. 1, 1909.	.20 to .80
Deck beams and bulk angles	.30
Hand rail tees	.75
Cutting to lengths, under 3 ft. to 2 ft. inclusive	.25
Cutting to lengths, under 2 ft. to 1 ft. inclusive	.50
Cutting to lengths, under 1 ft.	1.55
No charge for cutting to lengths 3 ft. and over.	

Wire Products.—Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days or 2 per cent. discount in 10 days, carload lots to jobbers, annealed, \$1.40; galvanized, \$1.80. Galvanized barb wire and fence staples to jobbers, \$2; painted, \$1.60. Wire nails to jobbers, \$1.60. Woven wire fencing, 73 per cent. off list for carloads; 72 off for 1000-rod lots; 71 off for less than 1000-rod lots.

The following table gives the price to retail merchants on fence wire in less than carloads, with the extras added to the base price:

Plain Wire, per 100 lb.

Nos.	0 to 9	10	11	12 & 12 1/2	13	14	15	16
Annealed	\$1.55	\$1.60	\$1.65	\$1.70	\$1.80	\$1.90	\$2.00	\$2.10
Galvanized	2.00	2.00	2.05	2.10	2.20	2.30	2.70	2.80

Wire Rods.—Bessemer, open-hearth and chain rods, \$25.50.

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on steel pipe in effect from April 20, 1914, and iron pipe from June 2, 1913, all full weight:

Butt Weld			Iron		
Steel	Black	Galv.	Steel	Black	Galv.
1/8, 1/4 and 3/8	73	52 1/2	1/8 and 1/4	66	47
1/2	77	66 1/2	1/2	65	46
3/4 to 3	80	71 1/2	1/2	69	56
			3/4 to 2 1/2	72	61

Lap Weld				
2	68 1/2	1 1/4	56	45
2 1/2 to 6	79	70 1/2	67	56
7 to 12	76	65 1/2	68	58
13 to 15	53	21 1/2 to 4	70	61
		4 1/2 to 6	70	61
		7 to 12	68	55

Reamed and Drifted					
1 to 3, butt	78	69 1/2	1 to 1 1/2, butt	70	59
2, lap	75	66 1/2	2, butt	70	59
2 1/2 to 6, lap	77	68 1/2	1 1/4, lap	54	43
			1 1/2, lap	65	54
			2, lap	66	56
			2 1/2 to 4, lap	68	59

Butt Weld, extra strong, plain ends					
1/8, 1/4 and 3/8	68	57 1/2	1/2	63	52
1/2	73	66 1/2	1/2	67	60
3/4 to 1 1/2	77	70 1/2	1/2 to 1 1/2	71	62
2 to 3	78	71 1/2	2 and 2 1/2	72	63

Lap Weld, extra strong, plain ends					
2	74	65 1/2	1 1/2	65	59
2 1/2 to 4	76	67 1/2	2	66	58
4 1/2 to 6	75	66 1/2	2 1/2 to 4	70	61
7 to 8	68	57 1/2	4 1/2 to 6	69	60
9 to 12	63	52 1/2	7 to 8	63	53
			9 to 12	58	47

To the large jobbing trade an additional 5 and 2 1/2 per cent. is allowed over the above discounts.

The above discounts are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized.

Boiler Tubes.—Discounts to jobbers, in carloads, in effect from May 1, 1914, on steel and from January 2, 1914, on iron, are as follows:

Lap Welded Steel	Standard Charcoal Iron
1 3/8 and 2 in.	62
2 1/4 in.	59
2 1/2 and 2 3/4 in.	65
3 and 3 1/4 in.	70
3 1/2 and 4 1/2 in.	72
5 and 6 in.	65
7 to 13 in.	62

Locomotive and steamship special charcoal grades bring higher prices.

2 1/2 in. and smaller, over 18 ft., 10 per cent. net extra.

2 3/4 in. and larger, over 22 ft., 10 per cent. net extra.

Less than carloads will be sold at the delivered discounts for carloads, lowered by two points for lengths 22 ft. and under to destinations east of the Mississippi River; lengths over 22 ft., and all shipments going west of the Mississippi River must be sold f.o.b. mill at Pittsburgh basing discount, lowered by two points. On standard charcoal iron tubes for desirable orders the above discounts are shaded an extra 5, and occasionally two 5's by some makers.

Sheets.—Makers' prices for mill shipment on sheets of U. S. Standard gauge, in carload and larger lots, on which jobbers charge the usual advance for small lots from store, are as follows, f.o.b. Pittsburgh, terms 30 days net, or 2 per cent. cash discount in 10 days from date of invoice:

Blue Annealed Sheets	Cents per lb.
Nos. 3 to 8	1.35 to 1.40
Nos. 9 to 10	1.40 to 1.45
Nos. 11 and 12	1.45 to 1.50
Nos. 13 and 14	1.55 to 1.60
Nos. 15 and 16	1.65 to 1.70

Box Annealed Sheets, Cold Rolled

	Cents per lb.
Nos. 10 and 11	1.55 to 1.65
No. 12	1.55 to 1.65
Nos. 13 and 14	1.60 to 1.70
Nos. 15 and 16	1.65 to 1.75
Nos. 17 to 21	1.70 to 1.80
Nos. 22 and 24	1.75 to 1.85
Nos. 25 and 26	1.80 to 1.90
No. 27	1.85 to 1.95
No. 28	1.90 to 2.00
No. 29	1.95 to 2.05
No. 30	2.05 to 2.15

Galvanized Sheets of Black Sheet Gauge

	Cents per lb.
Nos. 10 and 11	1.90 to 2.00
No. 12	2.00 to 2.10
Nos. 13 and 14	2.00 to 2.10
Nos. 15 and 16	2.15 to 2.25
Nos. 17 to 21	2.30 to 2.40
Nos. 22 and 24	2.45 to 2.55
Nos. 25 and 26	2.60 to 2.70
No. 27	2.75 to 2.85
No. 28	2.90 to 3.00
No. 29	3.05 to 3.15
No. 30	3.20 to 3.30

Pittsburgh

PITTSBURGH, PA., October 27, 1914.

Conditions in the steel trade are no better, but probably they are no worse. Aside from the Steel Corporation, whose ingot output is now at about a 60 per cent. rate, operations among independent steel companies are on a 40 to 45 per cent. basis, with the chances favoring a lower rate of operations. Hopes of the early future are predicated on the railroads getting the full 5 per cent. advance in freight rates, but even if the revenue of the railroads is slightly increased it will be used largely to pay off pressing obligations. The next four or five months in the steel trade are regarded with much concern, there being nothing in sight now that indicates in the slightest any improvement. Reductions in wages are being announced more frequently, a large steel interest in the Wheeling district having made cuts in salaries of officials, and has also materially reduced labor. Prices on tin plate and sheets are easier, while Bessemer and basic pig iron are off fully 25c. a ton or more. Plates are also weak, but not enough new business is coming out in pig iron, semi-finished or finished material to test the market. Consumers are buying only for actual needs, but in nearly all cases are urging prompt shipments, showing that stocks are very low.

Pig Iron.—A slightly better inquiry is reported for Bessemer and basic pig iron, and two or three fair-sized lots are under negotiation. Now that some actual business is coming out to test prices on Bessemer and basic iron they have shown a further decline, Bessemer not being above \$13.75, while basic is \$12.50 at Valley furnace. New inquiry for foundry iron is for small lots, and some foundries are doing so little that they are holding up shipments. There is practically no new demand for malleable Bessemer or gray forge. We quote Bessemer at \$13.75 to \$13.85; basic, \$12.50 to \$12.60; No. 2 foundry, \$12.75 to \$13; malleable Bessemer, \$12.75, and gray forge, \$12.50, all at Valley furnace, with a freight rate of 90c. a ton for delivery in the Pittsburgh district.

Billets and Sheet Bars.—Prices are lower, but in the absence of new buying it is difficult to state just what the market is. Specifications against contracts from the sheet and tin plate mills are less than in September. We quote Bessemer and open-hearth billets at \$19 to \$19.50, and Bessemer and open-hearth sheet bars \$19.50 to \$20, f.o.b. maker's mill, Youngstown; Bessemer and open-hearth billets, \$19.50 to \$20, and Bessemer and open-hearth sheet bars \$20 to \$20.50, f.o.b. maker's mill, Pittsburgh. Forging billets are quoted at \$25 for sizes up to but not including 10 x 10 in., and for carbons up to 0.25, the regular extras being charged for larger sizes and higher carbons. Forging billets running above 0.25 to 0.60 carbon take \$1 per ton extra. We quote axle billets at \$23 to \$24, f.o.b. Pittsburgh, depending on the order.

Ferroalloys.—No new business is being placed in ferromanganese, but several brokers are offering 80 per cent. English for prompt delivery from stock at \$65 and lower. It is probable that on a firm offer \$60 could be

done. Consumers are well covered over the next two or three months, and state they are getting prompt deliveries. An announcement of a further reduction in the price is expected at any time. We quote English 80 per cent. ferromanganese at \$65 to \$68 per ton, f.o.b. seaboard, but the lower price could be shaded. We quote 50 per cent. ferrosilicon, in lots up to 100 tons, at \$73; over 100 tons to 600 tons, \$72; over 600 tons, \$71, delivered in the Pittsburgh district. On 10 per cent. ferrosilicon the quotation is \$19; 11 per cent., \$20, and 12 per cent. \$21, f.o.b. cars Jackson County, Ohio, or Ashland, Ky., furnace. We quote 20 per cent. spiegeleisen at \$25 at furnace. We quote ferrotitanium at 8c. per lb. in carloads; 10c. in 2000-lb. lots and over, and 12½c. in less than 2000-lb. lots.

Steel Rails.—Practically no new orders are being placed for standard sections, and the demand for light rails is quiet. The Carnegie Steel Company received new orders and specifications in the past week for about 2000 tons. We quote standard section rails, made of Bessemer stock, at 1.25c., and of open-hearth, 1.34c., f.o.b. Pittsburgh. We quote light rails as follows, in carload lots: 8 and 10 lb. sections, 1.275c.; 12 and 14 lb., 1.225c.; 16 and 20 lb., 1.175c.; 25, 30, 35 and 40 lb., 1.125c., and 45 lb. sections, 1.125c. Extras over the above prices are as follows:

Bond drilling, one hole	\$0.045 per 100 lb.
Bond drilling, two holes	0.090 per 100 lb.
Bond drilling, one hole in flange	0.090 per 100 lb.
Bond drilling, two holes in flange	0.180 per 100 lb.
All 30 ft. and special lengths, down to but not including 12 ft.	0.045 per 100 lb.
Special lengths, 12 ft. and under	0.090 per 100 lb.
Notching	0.025 per 100 lb.

The above prices are for carload lots, the usual differentials being allowed for large lots.

Structural Material.—New buying is small in volume for immediate shipment, and inquiries are light. The Jones & Laughlin Steel Company has taken 250 tons for a new building for the Liberty Baking Company in this city. Bids go in this week on 750 tons for a new wharf at Balboa, and 200 tons for a wharf shed. The American Bridge Company has taken an apartment house 450 tons, and a bank building, about 400 tons, at Scranton, Pa. The maximum price of beams and channels up to 15-in. is 1.15c., but on a desirable specification this could be shaded \$1 per ton. One leading maker in this district states its minimum price is 1.15c., and that it will not shade it. We quote beams and channels up to 15-in. at 1.15c., f.o.b. Pittsburgh.

Plates.—The market on plates has settled down to a 1.10c. basis, but one local mill states it is not meeting this price. Very little is doing in car orders, but the Louisville & Nashville is reported to be inquiring for 800 steel hopper and the Northern Pacific for 100 passenger cars. Operations among the plate mills are getting less, and are not over 40 per cent. on the average. We quote ¼-in. and heavier plates at 1.10c. to 1.15c., f.o.b. Pittsburgh.

Skelp.—There is still some foreign inquiry for grooved and sheared steel skelp, and several fair-sized lots for delivery abroad have been closed. The domestic demand is dull, as the pipe mills are doing little. We quote: Grooved steel skelp, 1.15c.; sheared steel skelp, 1.20c.; grooved iron skelp, 1.50c., and sheared iron skelp, 1.60c., delivered to consumers' mills in the Pittsburgh district.

Wire Rods.—There is still some inquiry for rods for foreign shipment and two lots have lately been closed, amounting to about 750 tons. The domestic demand continues dull, and there has not been a large inquiry on the market for some time. The nominal price of Bessemer, open-hearth and chain rods is \$26, f.o.b. Pittsburgh, but on a desirable order this price would be shaded probably \$1 per ton.

Iron and Steel Bars.—While reports are that conditions with the agricultural implement makers are better, this is not reflected in their specifications, which so far this season have been light. The new demand for both iron and steel bars is dull, and specifications against contracts are unsatisfactory. We quote steel bars at 1.15c. for delivery over remainder of this year, but on a nice specification 1.10c. could be done. Some

business in steel bars for first quarter of 1915 has been closed at about 1.20c., maker's mill. We quote common iron bars at 1.15c. to 1.20c., f.o.b. Pittsburgh.

Sheets.—Local makers of sheets continue to report inquiries from England, Australia, India and several other foreign countries. Shipments abroad are being made regularly and are heavier than before the European war started. The domestic demand is dull and only for small lots, and prices on both black and galvanized are weaker. The heavy decline in spelter, which is now selling below 5c., is largely responsible for the decline in galvanized sheets, while excessive competition among some of the sheet mills has brought about lower prices for black. Several of the larger mills are holding No. 28 black sheets at 2c., and No. 28 galvanized at 2.90c., and state they will not shade these prices. We now quote No. 28 Bessemer black sheets at 1.90c. to 2c.; No. 28 galvanized, 2.90c. to 3c.; Nos. 9 and 10 blue annealed sheets, 1.40c. to 1.45c. The above prices are for carload and larger lots, jobbers charging the usual advances for small lots from store. Operations among the sheet mills are growing lighter, and are on a 50 per cent. basis or less.

Tin Plate.—While none of the large mills has made a price on tin plate for delivery over 1915, there has been a marked decline in prices for prompt shipment, and \$3.25 per box has been materially shaded. The tin-plate business this year has lasted longer than usual, but it is believed existing contracts will be pretty well cleaned up by November 15 or earlier. Several of the larger makers are still running their plants to nearly full capacity, but state they will commence to cut down operations very shortly. Not much new business is coming out, as this is the off season of the year in the tin-plate trade. We quote 100-lb. 14 x 20 coke plates at \$3.15 to \$3.25 per box, and 100-lb. 14 x 20 terne plates at \$3.10 to \$3.20 per box, f.o.b. Pittsburgh.

Wire Products.—There has been a revival in the foreign demand for barb wire, a local concern having a cable to-day for a large lot for October-November shipment, and another has been asked to make prices on all the barb wire it has in stock to be shipped promptly. It is now claimed that 50,000 tons or more have been shipped abroad by domestic mills since the war broke out. Two local manufacturers state that they have all the business they can take care of for this month and November. Most of the shipments of barb wire are going to England, to be used for defensive purposes. The domestic demand for wire and wire nails continues quiet, and specifications against contracts are dull. Were it not for the foreign demand that has come up, conditions in the wire industry would be a good deal worse than they are. On new orders we quote wire nails at \$1.60; plain annealed wire, \$1.40; galvanized barb wire and fence staples, \$2; painted barb wire, \$1.60, all f.o.b. Pittsburgh, freight added to point of delivery, terms 30 days net, less 2 per cent. off for cash in 10 days. We quote steel cut nails at \$1.60 to \$1.65, f.o.b. Pittsburgh, in carload lots. We quote woven wire fencing at 73 per cent. off in carload lots, 72 on 1000-rod lots and 71 on smaller lots, all f.o.b. Pittsburgh.

Shafting.—The new demand continues dull and only for small lots. Makers report that specifications from automobile builders are still coming in freely, this being about the only trade that is using any considerable quantity of shafting. While business with the agricultural implement makers is reported better, their specifications against contracts for shafting are unsatisfactory. At present the new demand does not represent more than 25 per cent. of capacity, if that much. We quote cold-rolled heating at 66 to 67 per cent. off, depending on the order, delivered in base territory.

Hoops and Bands.—The new demand is dull and only for small lots, while specifications are light. We quote steel bands at 1.15c., extras as per the steel bar card, and steel hoops at 1.25c., f.o.b. Pittsburgh.

Railroad Spikes.—None of the spike makers is operating to more than 30 to 40 per cent. of capacity, and two local plants are running only one or two days a week. There is practically no new demand, and specifications from the railroads against contracts are light.

We quote standard sizes of railroad and boat spikes at \$1.40 and small railroad and boat spikes at \$1.50 per 100 lb. in carload lots, f.o.b. Pittsburgh.

Nuts, Bolts and Rivets.—Makers state that the new demand is not any better, being only for small lots to cover current wants. Specifications against contracts are only fair. There is some foreign inquiry coming out, but so far little actual business has been closed. The new demand for structural and boiler rivets is dull, especially for the latter, as the boiler shops are doing but little. Discounts on nuts and bolts are more or less shaded, depending on the order. We quote structural rivets at 1.45c. to 1.50c., and boiler rivets at 1.55c. to 1.60c. in large lots, but there is very little new demand. Discounts on nuts and bolts are as follows in lots of 300 lb. or over, delivered within a 20c. freight radius of maker's works:

Coach and lag screws.....	80 and 5% off
Small carriage bolts, cut threads.....	80 and 5% off
Small carriage bolts, rolled threads.....	80 and 5% off
Large carriage bolts.....	75 and 5% off
Small machine bolts, cut threads.....	80 and 5% off
Small machine bolts, rolled threads.....	80 and 10% off
Large machine bolts.....	75 and 10% off
Machine bolts, c.p.c. & t nuts, small.....	80% off
Machine bolts, c.p.c. & t nuts, large.....	75 and 5% off
Square h.p. nuts, blank and tapped.....	\$6.30 off list
Hexagon nuts.....	\$7.20 off list
C.P.C. and r sq. nuts, blank and tapped.....	\$6.00 off list
Hexagon nuts, $\frac{1}{4}$ in. and larger.....	\$7.20 off list
Hexagon nuts, smaller than $\frac{1}{2}$ in.....	\$7.80 off list
C.P. plain square nuts.....	\$5.50 off list
C.P. plain hexagon nuts.....	\$5.90 off list
Semi-fin. hex. nuts, $\frac{1}{2}$ in. or under.....	85, 10 & 10% off
Semi-fin. hex. nuts, $\frac{3}{4}$ in. and larger.....	85 & 5% off
Rivets, 7/16 x 6 $\frac{1}{2}$, smaller & shorter.....	80, 10 & 5% off
Rivets, tin plated, packages.....	80, 10 and 5% off
Rivets, metallic tinned, packages.....	80, 10 and 5% off
Standard cap screws.....	70, 10 and 10% off
Standard set-screws.....	75, 10 and 10% off

Merchant Steel.—Mills report that the new demand only for small lots to meet current needs. Stocks held by jobbers are light, but specifications against contracts have been unsatisfactory for some time. Shipments by the mills in October were less than in September. Prices are purely nominal, and on small lots for prompt shipment are about as follows: Iron finished tire, $\frac{1}{2}$ x $1\frac{1}{2}$ in. and larger, 1.30c., base; under $\frac{1}{2}$ x $1\frac{1}{2}$ in., 1.45c.; planished tire, 1.50c.; channel tire, $\frac{3}{4}$ to $\frac{5}{8}$ and 1 in., 1.80c. to 1.90c.; $1\frac{1}{2}$ in. and larger, 1.90c.; toe calk, 1.90c. to 2c., base; flat sleigh shoe, 1.65c.; concave and convex, 1.70c.; cutter shoe, tapered or bent, 2.20c. to 2.30c.; spring steel, 1.90c. to 2c.; machinery steel, smooth finish, 1.70c. We quote cold-rolled strip steel as follows: Base rates for 1 in. and $1\frac{1}{2}$ in. and wider, under 0.20 carbon, and No. 10 and heavier, hard temper, 3.25c.; soft, 3.50c.; coils, hard, 3.15c.; soft, 3.40c.; freight allowed. The usual differentials apply for lighter sizes.

Standard Pipe.—The October demand for merchant pipe has been 10 to 15 per cent. better than in September. Foreign shipments, which were entirely cut off when the European war started, are again going forward promptly. There is some demand for casing and other oil-well supplies, but as a rule the pipe mills are not operating to more than 30 to 40 per cent. of capacity. A local mill has taken an order for about 60 miles of 6, 8, 10 and 12 in. line pipe to go to Waco, Texas. This is the first large order for line pipe placed in this market for some time. Discounts on iron and steel pipe are being well held.

Boiler Tubes.—There is very little new demand for locomotive or merchant tubes and discounts are materially shaded, depending on the order.

Coke.—A local interest has sold 3000 to 4000 tons of coke at the reported price of \$1.75 per net ton at oven. This is somewhat higher than the regular market, but the coke sold in this case has had a very high reputation for quality. Operations in the coke trade are steadily growing less, and recently the H. C. Frick Coke Company has blown out about 1200 ovens in the Connellsville region. We quote standard makes of blast-furnace coke for prompt shipment at \$1.60 and 72-hr. foundry coke at \$2, and on contracts about \$2.25 per net ton at oven. Some grades of blast furnace coke, running high in sulphur, have been sold below \$1.50 per ton, and foundry coke at \$1.75 to \$1.85 per ton. The Connellsville Courier reports the output of

coke in the upper and lower Connellsville regions for the week ended October 17 as 237,729 tons, a decrease over the previous week of nearly 9000 tons. This is the smallest output of coke in the two Connellsville regions for some months.

Old Material.—Due to lack of demand and accumulation of stocks or scrap, prices have further declined, selected heavy steel melting scrap having sold as low as \$10.50, while borings and turnings are off from 10 to 15c. per ton. Foundry operations are light, and the demand for foundry scrap is dull. Dealers state that consumers do not seem interested, even at the low prices ruling, but, on the other hand, dealers are not disposed to sell short, as they claim it is hard to pick up scrap from producing centers at the low prices ruling. The scrap lists of the Pennsylvania and Baltimore & Ohio railroads were received here to-day, and both roads are asking bids on larger tonnages than usual. A sale is reported of 600 tons of selected heavy steel melting scrap at \$10.50, delivered, and 300 tons of cast-iron borings at about \$8.35, delivered. For delivery to consumers' mills in the Pittsburgh and other consuming districts that take Pittsburgh freights dealers quote about as follows:

Heavy steel melting scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen, Midland and Pittsburgh delivery	\$10.50 to \$10.75
Compressed side and end sheet scrap	9.50 to 9.75
No. 1 foundry cast	11.50 to 11.75
No. 2 foundry cast	10.25 to 10.50
Bundled sheet scrap, f.o.b. consumers' mills, Pittsburgh district	8.25 to 8.50
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	12.00 to 12.25
No. 1 railroad malleable stock	10.25 to 10.50
Railroad grate bars	9.50 to 9.75
Low phosphorus melting stock	13.50 to 13.75
Iron car axles	19.00 to 19.50
Steel car axles	13.50 to 14.00
Locomotive axles, steel	20.00 to 20.50
No. 1 busheling scrap	9.50 to 9.75
No. 2 busheling scrap	6.50 to 6.75
Machine shop turnings	7.75 to 8.00
Old carwheels	11.25 to 11.50
Cast-iron borings	8.35 to 8.50
Sheet bar crop ends	11.00 to 11.25
Old iron rails	13.00 to 13.25
No. 1 railroad wrought scrap	11.00 to 11.25
Heavy steel axle turnings	8.25 to 8.50
Heavy breakable cast scrap	10.75 to 11.00

†Shipping point.

Chicago

CHICAGO, ILL., October 28, 1914.—(By Wire.)

Better inquiry, a few more sales and very low prices injected some interest into the pig-iron market last week, but brought little consolation to producers. The very attractive quotations now being made are leading consumers to a consideration of their first-quarter and first-half requirements, but every evidence points to the likelihood of current quotations applying to deliveries in at least the next five months. For the steel mills the week developed less new business than has been booked within recent memory. It is safe to say that mill operations in the Chicago district will drop to a 30 per cent. average this week. It is strikingly evident that, through the limited tonnage created by orders for the heavier steel products, mills find themselves continually in operating difficulties. Railroad purchases during the week included one lot of tie-plates, a few small lots of rails, about 1200 tons of steel underframes for Northern Pacific cars and but little else. In structural material the market has been interested in the resale of about 1500 tons in lots of 300 and 400 tons to local fabricators at a price of 1.18c., Chicago. Local plate and bar mills are practically at the end of their string. Orders for sheets, in contrast to other finished products, are sufficient to permit of fairly satisfactory mill operations. Conditions in the scrap market are unchanged.

Pig Iron.—The steel companies here have again become the most important factor in the merchant pig-iron market. One company, whose excess output has ordinarily been an off-basic iron adapted to the requirements of a comparatively limited number of consumers, is now continuously offering iron that fully satisfies

standard foundry grading. For this iron quotations equivalent to \$12.75 at the furnace are being made. Another steel company, seldom selling merchant iron, is now meeting quite a range of specifications. Some of the prices recently made for analysis iron, while they do not reflect the position of producers in the matter of standard grades, evidence an anxiety to move off the accumulating stocks at the best prices obtainable. A purchase of something over 500 tons of Northern iron is understood to have been divided between two furnaces outside of the immediate Chicago district at a price the Chicago equivalent of which would be even lower than above quoted. Melters attracted by the speculative possibilities of current quotations are inquiring more freely regarding next year's requirements, but there seems little prospect of the furnaces being able to book much of this business at better prices than now obtain for prompt shipment. Southern iron, for the time being, is a minor factor in this market. The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable Bessemer and basic iron, which are f.o.b. furnace and do not include a local switching charge averaging 50c. a ton:

Lake Superior charcoal	\$15.75 to \$16.75
Northern coke foundry, No. 1	13.25 to 13.75
Northern coke foundry, No. 2	12.75 to 13.25
Northern coke foundry, No. 3	12.75 to 13.25
Southern coke, No. 1 f'dry and 1 soft	14.50 to 14.75
Southern coke, No. 2 f'dry and 2 soft	14.00 to 14.25
Malleable Bessemer	13.00 to 13.50
Standard Bessemer	17.00
Basic	12.50 to 13.00
Low phosphorus	20.00 to 20.50
Jackson Co. and Ky. silvery, 6 per cent.	16.90 to 17.40
Jackson Co. and Ky. silvery, 8 per cent.	17.90 to 18.40
Jackson Co. and Ky. sil'vy, 10 per cent.	18.90 to 19.40

(By Mail)

Rails and Track Supplies.—Orders for rails last week were confined to an almost negligible tonnage and the activity of the railroads in the matter of general purchases was correspondingly limited. A sale of about 2000 tons of tie plates was made at a price slightly under \$25 at mill. We quote standard railroad spikes at 1.50c. to 1.60c., base; track bolts with square nuts, 1.90c. to 2c., base, all in carload lots, Chicago; tie plates, \$25 to \$27, f.o.b. mill, net ton; standard section Bessemer rails, Chicago, 1.25c., base; open hearth, 1.34c.; light rails, 25 to 45 lb., 1.25c.; 16 to 20 lb., 1.30c.; 12 lb., 1.35c.; 8 lb., 1.40c.; angle bars, 1.50c., Chicago.

Structural Material.—The general contract for the Second Regiment Armory at Chicago has been let and fabricators are figuring on steel for this job amounting to about 900 tons. The Haskell & Barker Car Company has placed orders for nearly 1200 tons of steel for underframes for Northern Pacific cars. There has scarcely been a week when this market offered less of interest in connection with structural matters. Prices are undoubtedly down to the 1.10c., Pittsburgh, basis, but quotations on material from mill should not be confused with the prices that have been made the past few weeks in this market on the resale material sold from the former plant of the Chicago Steel Products Company. It is understood that something over 1500 tons of shapes and plates have been moved on the basis of 1c., Pittsburgh. The only fabricated material contracted for in this market was 207 tons for the American Tar Products Company. For plain material for Chicago delivery from mill we continue to quote 1.28c. to 1.33c.

We quote for Chicago delivery of structural shapes from store 1.75c.

Plates.—The scarcity of plate tonnage is sufficiently evidenced by the fact that for a part of this week at least there will be no plate mill capacity active in this district. We quote for Chicago delivery of plates from mill 1.28c.

We quote for Chicago delivery of plates out of store 1.75c.

Sheets.—Mill operations here are on a better scale in connection with the rolling of sheets than with respect to any other of the principal products. Business has not been sufficient, however, to prevent the market dropping back quite generally now to the basis of 2.08c. and 3.08c., Chicago for black and galvanized. With few

exceptions bookings are also confined to this year, although the mills are unquestionably in a more receptive mood regarding first-quarter tonnage. We quote for Chicago delivery from mill: No. 10 blue annealed, 1.58c.; No. 28 black, 2.08c. to 2.18c.; No. 28 galvanized, 3.08c. to 3.18c.

We quote for Chicago delivery from jobbers' stocks as follows, minimum prices applying on bundles of 25 or more: No. 10 blue annealed, 1.95c.; No. 28 black, 2.55c.; No. 28 galvanized, 3.55c.

Bars.—Something of the quietness of the situation may be illustrated by the fact that a specification for 250 tons of steel bars booked at 1.15c., Pittsburgh, was among the most desirable business placed. For other business the mills were less fortunate as regards price. For bar iron record prices are being made at Chicago, and lower than 1c. at the mill has been done. The very limited amount of new building construction has greatly reduced the tonnage of reinforcing bars normally required at this season and quotations, particularly for hard steel, are largely nominal. We quote for mill shipments as follows: Bar iron, .97 1/2c. to 1.05c.; soft steel bars, 1.33c. to 1.38c.; hard steel bars, 1.25c. to 1.30c.; shafting in carloads, 65 per cent. off; less than carloads, 60 per cent. off.

We quote store prices for Chicago delivery: Soft steel bars, 1.65c.; bar iron, 1.65c.; reinforcing bars, 1.65c. base, with 5c. extra for twisting in sizes $1\frac{1}{2}$ in. and over and usual card extras for smaller sizes; shafting 60 per cent. off.

Rivets and Bolts.—Mill orders for bolts and for rivets as well are so far from being satisfactory that comment is productive of little value. We continue to quote from mill as follows: Carriage bolts up to $\frac{3}{8}$ x 6 in., rolled thread, 85; cut thread, 80-5; larger sizes, 80; machine bolts up to $\frac{3}{8}$ x 4 in., rolled thread, 85-5; cut thread, 85; larger sizes, 80-5; coach screws, 85-10; hot pressed nuts, square head, \$6.60 off per cwt.; hexagon, \$7.00 off per cwt. Structural rivets, $\frac{3}{8}$ to $1\frac{1}{4}$ in., 1.58c. base, Chicago, in carload lots; boiler rivets, 10c. additional.

We quote out of store: Structural rivets, 2.20c.; boiler rivets, 2.30c.; machine bolts up to $\frac{3}{8}$ x 4 in., 75-15; larger sizes, 70-10-10; carriage bolts up to $\frac{3}{8}$ x 6 in., 75-10; larger sizes, 70-15 off; hot pressed nuts, square head, \$6. and hexagon, \$6.70 off per cwt.

Old Material.—The appearance of inquiry for one or two items in the scrap list seems to have restored some quotations to higher levels. While markedly at variance with the trend of the market for a number of weeks, this slight advance is not so much an occasion for encouragement as it is an illustration of the fact that prices have largely been nominal. Iron angles and arch bars and transoms which sold a week ago for \$10.25 are now being held at \$11. The minimum price for No. 2 railroad wrought is now put at \$7.25 and No. 2 busheling is held at \$5.50. Trading continues limited to a minimum of activity. Scrap lists submitted for figures during the week include 2500 tons from the Burlington, 3200 tons from the Rock Island and 700 tons from the Chicago Great Western. We quote for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Old iron rails	\$11.00 to \$11.25
Old steel rails, rerolling	16.00 to 10.50
Old steel rails, less than 3 ft.	9.25 to 9.50
Old carwheels	10.50 to 11.00
Heavy melting steel scrap	8.50 to 8.75
Frogs, switches and guards, cut apart	8.50 to 8.75
Shoveling steel	8.00 to 8.25
Steel axle turnings	6.50 to 7.00

Per Net Ton

Iron angles and splice bars	\$10.75 to \$11.25
Iron arch bars and transoms	10.75 to 11.25
Steel angle bars	7.75 to 8.25
Iron car axles	13.75 to 14.25
Steel car axles	11.00 to 11.50
No. 1 railroad wrought	7.75 to 8.00
No. 2 railroad wrought	7.25 to 7.50
Cut forgings	7.25 to 7.50
Steel knuckles and couplers	8.50 to 9.00
Steel springs	9.25 to 9.50
Locomotive tires, smooth	8.75 to 9.25
Machine shop turnings	4.75 to 5.00
Cast borings	4.75 to 5.00
No. 1 busheling	6.50 to 6.75
No. 2 busheling	5.50 to 5.75
No. 1 boilers, cut to sheets and rings	5.00 to 5.50
Boiler punchings	8.75 to 9.25
No. 1 cast scrap	9.00 to 9.25
Stove plate and light cast scrap	8.25 to 8.50
Grate bars	7.75 to 8.00
Railroad malleable	7.75 to 8.00
Agricultural malleable	7.50 to 7.75
Pipes and flues	5.50 to 5.75

Wire Products.—Although wire fencing has helped materially in maintaining the volume of business in wire products, this seems now to be failing in this territory and bookings last week were very modest. Prices seem to be supported largely upon mill bookings from other than domestic sources. We quote to jobbers as follows: Plain wire, No. 9 and coarser, base, \$1.58; wire nails, \$1.78; painted barb wire, \$1.78; galvanized, \$2.18; polished staples, \$1.78; galvanized, \$2.18, all Chicago.

Cast-Iron Pipe.—The only new lettings for which bids are to be received the coming week, in addition to the small tonnage at Findlay, Ohio, are 150 tons at Ashton, Ill., and about 60 tons at Hammond, Ind. We quote as follows, per net ton, Chicago: Water pipe, 4 in., \$26; 6 to 12 in., \$24; 16 in. and up, \$23.50, with \$1 extra for gas pipe.

Philadelphia

PHILADELPHIA, PA., October 27, 1914.

On every side the iron and steel trade is inactive. One mill in this territory reports the lightest influx of orders in its history. There appears to be but little or no promise of any substantial change for the better in the near future. The policy of all consumers seems to be one of conservatism which is spreading in all lines. There is not much to definitely indicate actual prices. In pig iron business is not only slow but the trade has been unfavorably affected by the receivership of a large local pipe-making concern. Quotations for bars, plates and shapes show a tendency to soften. The old material market is stagnant and prices throughout the list are nominal.

Iron Ore.—Shipments against old contracts comprise all the business under this head. In the week ended October 24 importations at this port were 7138 tons of iron ore from Sweden and 3820 tons from Spain. In September total imports of iron ore were 63,027 tons.

Pig Iron.—The only transaction of notable size is one of 2000 tons of Southern spot iron which was sold on a basis of \$10.25, Birmingham, to a local pipe foundry. Otherwise the market story is one of apathy which has set sellers to wondering if they will be paid for iron if it is shipped, a mental attitude which is no doubt inspired by the appointment of receivers for R. D. Wood & Co. While the creditors of the involved firm are satisfied as to the more than ample sufficiency of assets to meet all demands, they at the same time realize that large amounts of their money are likely to be tied up for a considerable period. Disquieting reports of lower prices are more frequently heard, as well as requests to hold up shipments, though interspersed with the latter are occasional requests that small shipments be hurried in cases where foundries have run short. As a general thing the making of castings is not only quiet, but irregular. It is pointed out by a producer of pig iron that production is considerably greater than consumption, that in the end some one must suffer, and that in the case of one of his furnaces which has been undergoing repairs orders have been given for it to remain idle until conditions have changed, much as the laying off of employees is regretted. The general asking price for eastern Pennsylvania No. 2 X is \$14.50. Quotations for standard brands for early delivery in buyers' yards in this district are as follows:

Eastern Penna. No. 2 X foundry	\$14.50 to \$14.75
Eastern Penna. No. 2 plain	14.25 to 14.50
Virginia No. 2 foundry	15.25
Virginia No. 2 plain	15.00
Gray forge	13.50 to 13.75
Basic	14.00
Standard low phosphorus	20.50 to 21.00

Ferroalloys.—There is but little of interest in this market beyond the unconfirmed report of an inquiry from Australia for 200 tons of ferromanganese, on which \$70 is said to have been quoted. For domestic delivery the price is unchanged at \$68, seaboard. Ferrosilicon, 50 per cent., is unchanged at \$71 to \$73, Pittsburgh, according to quantity. In the week ended October 24, 1210 tons arrived at this port from England, as well as 30 tons of ferrosilicon from the same country. In the month of September 2771 tons of ferromanganese arrived here.

Bars.—Specifications have been coming out slowly and new business has been quiet. The general quotation for steel bars is 1.30c., Philadelphia, on the basis of 1.15c., Pittsburgh. Some indication of the weakness of the market is afforded by an instance where a consumer, inquiring for 180 tons of twisted squares, said he could get lower than 1.20c., which is equivalent to lower than 1.15c. for plain bars. At the same time, on part carloads 1.35c., Philadelphia, is being obtained. Iron bars are weak at 1.12c., Philadelphia.

Plates.—While 1.30c., Philadelphia, is asserted to be the general quotation for moderate lots, it is admitted that 1.25c., Philadelphia, which is on a basis of 1.10c., Pittsburgh, would not be spurned where a good-sized order was at stake. The business of the week has been irregular and has shown no improvement.

Structural Material.—In this territory there has been no business which would serve to fix the precise level of prices. While 1.15c., Pittsburgh, or 1.30c., Philadelphia, is the ostensible quotation, there are those in the trade who say that they would expect to do lower if they were buyers. Bids were put in yesterday for a Pennsylvania Railroad bridge at Wilkinsburg, Pa., requiring about 500 tons. The Union National Bank Building, Scranton, involving about 450 tons, has been placed with the American Bridge Company. Bids are being received for the Pennsylvania State penitentiary to be built in Center County, the Thompson-Starrett Company being among the bidders. Two propositions for the Panama Canal will take about 1000 tons, the bids to be in October 28 and October 31.

Billets.—Local makers declare there is no market for billets, but that their quotation is unchanged at \$22.40, Philadelphia, for open-hearth rolling billets, with forging steel \$4 higher.

Sheets.—The demand has fallen off steadily in the last two weeks, but the quotation for No. 10 blue annealed is unchanged at 1.55c., Philadelphia.

Coke.—The market partakes of all the inactivity of the iron trade. Quotations run about \$1.60 to \$1.65 per net ton at oven for prompt furnace coke and \$2.15 to \$2.35 for foundry. Freight rates to this city from the principal producing districts are as follows: Connellsville, \$2.05; Latrobe, \$1.85, and Mountain, \$1.65.

Old Material.—No interest is being shown in scrap and prices are nominal. Quotations are as follows for delivery in buyers' yards in this district covering eastern Pennsylvania and taking freight rates from 35c. to \$1.35 per gross ton:

No. 1 heavy melting steel	\$9.50 to \$10.00
Old steel rails, rerolling	11.50 to 12.00
Low phosphorus heavy melting steel	
scrap	13.50 to 14.00
Old steel axles	13.00 to 13.50
Old iron axles	17.50 to 18.00
Old iron rails	13.00 to 14.00
Old carwheels	9.50 to 10.00
No. 1 railroad wrought	11.50 to 12.00
Wrought-iron pipe	9.50 to 10.00
No. 1 forge fire	8.00 to 8.50
Bundled sheets	8.00 to 8.50
No. 2 busheling	7.75 to 8.25
Machine shop turnings	7.50 to 8.00
Cast borings	7.50 to 8.00
No. 1 cast	11.00 to 12.00
Grate bars, railroad	8.00 to 8.50
Stove plate	8.00 to 8.50
Railroad malleable	9.00 to 9.50

Cleveland

CLEVELAND, OHIO, October 27, 1914.

Iron Ore.—A speculative purchase of 10,000 tons has been made by a consumer who saw possibilities of higher ore prices next season. During the summer some of the ore firms predicted some speculative buying before the close of the shipping season, but with the development of conditions brought on by the war this buying has failed to materialize, aside from the one sale noted above. Some of the shippers are bringing down their last cargoes and others will move very little ore in November. The close of the shipping season will be the earliest in many years. We quote prices as follows: Old range Bessemer, \$3.75; Mesaba Bessemer, \$3.50; old range non-Bessemer, \$3.00; Mesaba non-Bessemer, \$2.85.

Pig Iron.—The local market is slightly weaker, apparently being affected by the 25c. decline in quotations on foundry, basic and malleable iron in the valleys. One local furnace is now offering No. 2 foundry at \$13.50, delivered Cleveland, and will probably meet the Mahoning Valley price of \$12.75 at furnace for outside shipments. Some of the northern Ohio furnaces express a willingness to take first quarter business at current prices, providing the orders include iron for November and December delivery. Several weeks ago some first quarter business was booked at an advance of 25c. over prices then prevailing, but producers now apparently see no hope of better prices. The same statement applies to Southern iron. A few small lots of Southern brands have been made at \$10, Birmingham, for No. 2 for delivery during the remainder of 1914 and the first quarter of next year. Little buying is expected on this basis, as few consumers need additional iron for this year's delivery. The Ohio railroads have issued their new tariff covering the 5 per cent. increase in freight rates on pig iron, effective October 26. Under the new schedule the rate between Cleveland and Valley points is increased from 90c. to 95c. A similar percentage of increase in rates between other points in the territory is made. We quote, delivered Cleveland, as follows:

Bessemer	\$14.95
Basic	13.70
Northern No. 2 foundry	\$13.50 to 13.75
Southern No. 2 foundry	14.00
Gray forge	13.25
Jackson Co. silvery, 8 per cent. silicon	17.62
Standard low phos., Valley furnace	20.25 to 20.50

Coke.—There is practically no demand for furnace or foundry grades. The production, which is said to be the lowest in years, is still in excess of consumption, and it is reported that many more ovens will be shut down. We quote standard Connellsburg furnace coke at \$1.50 to \$1.60 per net ton at oven and standard foundry coke at \$2.25 to \$2.50.

Finished Iron and Steel.—The structural situation shows considerable improvement, although the demand in other lines is at a low ebb. The Toledo Bridge & Crane Company is low bidder for a bascule span requiring 1000 tons for a new bridge at Chattanooga, Tenn., and the Vang Construction Company, Cumberland, Md., is low bidder for the remainder of the bridge, requiring 400 tons of reinforcing bars. T. H. Brooks & Co., Cleveland, have taken 200 tons for the Madison Square Theater, Cleveland, and new inquiries include 600 tons for the new sheet mills building for the Empire Rolling Mill Company and 500 tons for the Western Reserve National Bank at Warren. The Union National Bank, Cleveland, will erect a 15-story building, plans for which will be out shortly. Prices on steel bars and structural material are firm at 1.15c., and plate prices are unchanged at 1.10c. to 1.15c., Pittsburgh, although it is reported that Chicago mills are making sales as low as 1.05c. The Cleveland bar-iron mills are in operation this week, and the Upson Nut Company has started two open-hearth furnaces, the remainder of its steel plant being shut down. The demand for sheets is dull, but a number of the mills are adhering to 2c. for No. 28 black, 3c. for No. 28 galvanized, and 1.50c. for No. 10 blue annealed. However, these prices are being shaded \$1 a ton. Warehouse prices are 1.80c. for steel bars and 1.90c. for plates and structural material.

Bolts, Nuts and Rivets.—A local bolt and nut maker reports October specifications better than during any month since May. New business is light. There is little activity in rivets, with prices unchanged at \$1.45 to \$1.50 for structural and \$1.55 to \$1.60 for boiler rivets. We quote discounts as follows: Common carriage bolts, $\frac{3}{8}$ x 6 in., smaller or shorter, rolled thread, 80 and 20 per cent.; cut thread, 80 and 20 per cent.; larger or longer, 75 and 15 per cent.; machine bolts with h. p. nuts, $\frac{3}{8}$ x 4 in., smaller or shorter, rolled thread, 80 and 25 per cent.; cut thread, 80 and 20 per cent.; larger or longer, 80 per cent.; coach and lag screws, 80 and 25 per cent.; square h. p. nuts, blank or tapped, \$6.30 off; hexagon h. p. nuts, blank or tapped, \$7.20 off; c. p. and t. square nuts, blank or tapped, \$6 off; hexagon, $\frac{3}{8}$ in. and larger, \$7.20 off; 9/16 in. and smaller, \$7.80 off; semi-finished hexagon nuts, $\frac{3}{8}$ in. and larger, 85, 10 and

5 per cent.; 9/16 in. and smaller, 85, 10, 10 and 5 per cent.

Old Material.—Further dullness is noted on several grades and prices generally have reached a lower level than at any previous time since 1898. Heavy mill steel is unchanged at last week's prices, usual quotations being \$8.75 for yard material and \$9.25 for new stock; but heavy steel is being offered to dealers at \$8.50. Sharon and Canton mills are offering only \$10 for heavy steel and Youngstown mills are out of the market and are not taking shipments. Quotations on borings and turnings, which have remained stationary several weeks, have declined 25c. a ton, there being no market for them at present. No. 1 cast scrap has sold in Cleveland as low as about \$9.50. We quote, f.o.b. Cleveland, as follows:

Per Gross Ton

Old steel rails, rerolling	\$11.00 to \$11.75
Old iron rails	12.00
Steel car axles	11.75 to 12.00
Heavy melting steel	8.75 to 9.25
Old carwheels	10.75 to 11.00
Relaying rails, 50 lb. and over	23.00 to 25.00
Agricultural malleable	8.50 to 9.00
Railroad malleable	9.75 to 10.00
Light bundled sheet scrap	7.50 to 8.00

Per Net Ton

Iron car axles	\$16.75 to \$17.00
Cast borings	5.50 to 5.75
Iron and steel turnings and drillings	5.00 to 5.25
Steel axle turnings	6.00 to 6.25
No. 1 busheling, new	8.00 to 8.25
No. 1 busheling, old	7.75 to 8.00
No. 1 railroad wrought	9.50 to 10.00
No. 1 cast	9.75 to 10.00
Stove plate	7.50

Buffalo

BUFFALO, N. Y., October 27, 1914.

Pig Iron.—The abnormally low prices now current, unprofitable from the producers' standpoint, are apparently no incentive for buyers, and furnacemen are not making any aggressive effort to sell. The total of sales for the week, however, was somewhat larger than for the week previous, aggregating perhaps 4500 tons of all grades, comprised of small lots to Buffalo district users and one or two moderate lots outside of the district. The improvement noted in the machinery trade has not affected the melt of foundries in this section. Prices are unchanged from last week's report and we continue same as the current schedule, fourth quarter delivery, f.o.b. furnace:

No. 1 foundry	\$12.75 to \$13.00
No. 2 X foundry	12.25 to 12.75
No. 2 plain	12.25 to 12.75
No. 3 foundry	12.25 to 12.75
Gray forge	12.25 to 12.75
Malleable	12.50 to 12.75
Basic	13.25 to 13.75
Charcoal, regular brands and analysis	16.25 to 17.25
Charcoal, special brands and analysis	20.50

Finished Iron and Steel.—Specifications on contracts continue to come in for moderate tonnages, but new inquiry is rather light. A few buyers are commencing to sound the market on contracts into next year for bars, shapes, sheets and tin plate, and the mills at this time are inclined to quote for such delivery. It is understood that considerable amounts of barbed wire have been placed by Canadian manufacturers with United States mills, as the output of Canadian mills for barbed wire is comparatively limited and the unusual European demand has taken their entire output and caused an overflow to mills in this country. It is stated that one large mill in Canada offered to sublet 500 tons of barbed wire at \$1 advance over their regular price when they found the United States mills were also filled for the remainder of the year. The structural material market shows improvement in inquiry, but prices remain low. Bids are to be received October 30 for the 400 tons for Troop I armory, this city, also for two dormitory buildings at Cornell University, Ithaca. The Utica Steam Engine & Boiler Works has 100 tons for printing building for the E. P. Bailey Company, Utica.

Old Material.—The market is weaker in all lines. Heavy melting steel is most affected with a drop of 50c. per ton and only a small tonnage was marketed at the reduced quotations. Demand in all lines is very light and prices for car wheels, turnings and borings, grate

bars, stove plate, wrought pipe and No. 1 busheling scrap have declined. Although demand for iron and steel axles is small, prices for these commodities have not suffered. We quote dealers' selling prices per gross ton, f.o.b. Buffalo, as follows:

Heavy melting steel	\$9.00 to \$9.50
Low phosphorus steel	12.50 to 13.00
No. 1 railroad wrought scrap	9.50 to 10.00
No. 1 railroad and machinery cast	9.75 to 10.25
Old steel axles	11.50 to 12.00
Old iron axles	17.00 to 17.50
Old carwheels	10.00 to 10.50
Railroad malleable	9.00 to 9.50
Machine shop turnings	5.25 to 5.75
Heavy axle turnings	7.50 to 8.25
Clean cast borings	5.75 to 6.25
Old iron rails	11.25 to 11.50
Locomotive grate bars	8.50 to 9.00
Stove plate (net ton)	8.50 to 9.00
Wrought pipe	6.50 to 7.00
Bundled sheet scrap	6.25 to 6.50
No. 1 busheing scrap	7.25 to 7.75
No. 2 busheling scrap	5.00 to 5.50
Bundled tin scrap	10.50

Cincinnati

CINCINNATI, OHIO, October 28, 1914.—(By Wire.)

Pig Iron.—While Southern makers have not definitely opened their books for next year, it is known that they are in a receptive mood and would take on business at \$10, Birmingham, for No. 2 foundry for first-quarter shipment. Northern foundry is flat at \$13, Ironton, for this delivery, and it is rumored that the same figure could be inserted in desirable contracts for first-half shipment. The largest known sale last week covers 500 tons of Southern foundry iron to a Central Western melter, for shipment during the next five months. Other sales only embrace the usual number of carload lots to fill in. A local inquiry is before the trade for 400 tons of Southern iron for shipment before April 1. A number of other inquiries have been received, but, as the majority of them are from consumers who are behind in taking iron on old contracts, it is thought that they were merely put out as feelers to ascertain present market conditions. Stocks are accumulating in the South, as shipments are far behind production. One redeeming feature of the situation may be cited in the comparatively small stocks in foundry yards. If by chance the melt should increase at a rapid rate, many foundries would be embarrassed in getting a supply of iron promptly. A few small lots of Ohio silvery iron have been sold lately at prevailing quotations. Both malleable and basic are very sluggish. Based on freight rates of \$2.90 from Birmingham and \$1.20 from Ironton, we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 f'dry and 1 soft	\$13.40 to \$13.90
Southern coke, No. 2 f'dry and 2 soft	12.90 to 13.45
Southern coke, No. 3 foundry	12.40 to 12.90
Southern No. 4 foundry	11.90 to 12.40
Southern gray forge	11.40 to 11.90
Ohio silvery, 8 per cent. silicon	17.20 to 17.70
Southern Ohio coke, No. 1	15.20 to 15.70
Southern Ohio coke, No. 2	14.20 to 14.70
Southern Ohio coke, No. 3	13.95 to 14.20
Southern Ohio malleable Bessemer	14.20
Basic, Northern	14.45 to 14.95
Lake Superior charcoal	15.25 to 17.25
Standard Southern carwheel	26.90 to 27.40

(By Mail)

Coke.—Sales of both furnace and foundry coke have reached the lowest level in the recollection of the trade here. Only a few carloads of foundry coke are purchased by consumers who have no contracts to draw on, but the total tonnage is exceedingly small. Shipments on contracts are still being held up, except in a few instances where foundries are busy on machine tool castings. No contracts for furnace coke are in sight. Connellsville 48-hr. coke is obtainable all the way from \$1.60 to \$1.75 per net ton at oven, and it is understood a small lot was forced on the market at \$1.50 for prompt shipment. Foundry coke ranges from \$2 to \$2.25 at oven, but some Wise County producers are asking \$2.50. Wise County furnace coke is about on the same level as foundry coke prices. It is reported that in both the Wise County and Pocahontas districts, on account of the slack demand, very little 48-hr. coke is being made.

Finished Material.—With the exception of a little business in reinforcing concrete rods, very little is doing in this territory. A fair demand is experienced for sheets, but as the Southern market is now comparatively cut off the mills are compelled to turn elsewhere to dispose of the tonnage that formerly went to that territory at this season. However, reports from the South indicate an earlier clearing up of the situation than was anticipated. As far as is known the mills in this territory are adhering firmly to 2.15c. for No. 28 black sheets and 3.15c. for galvanized sheets, f.o.b. Cincinnati or Newport, Ky. Steel bars and light structural shapes are quoted from stock at 1.80c. to 1.85c. Hoops and bands are quiet.

Old Material.—The market is very dull, with no indications of any early improvement. There is practically no demand from any source, although a few local foundries purchased small lots of scrap last week. The minimum figures given below represent what buyers are willing to pay for delivery in their yards southern Ohio and Cincinnati, and the maximum quotations are dealers' prices f.o.b. at yards:

Per Gross Ton

Bundled sheet scrap	\$6.00 to \$6.50
Old iron rails	10.75 to 11.25
Relaying rails, 50 lb. and up	19.50 to 20.00
Rerolling steel rails	9.75 to 10.25
Melting steel rails	8.50 to 9.00
Old carwheels	9.50 to 10.00
Heavy melting steel	8.25 to 8.75

Per Net Ton

No. 1 railroad wrought	\$7.75 to \$8.25
Cast borings	3.75 to 4.25
Steel turnings	3.75 to 4.25
Railroad cast scrap	9.00 to 9.50
No. 1 machinery cast scrap	9.75 to 10.25
Burnt scrap	5.75 to 6.25
Old iron axles	14.25 to 14.75
Locomotive tires (smooth inside)	9.00 to 9.50
Pipes and flues	5.75 to 6.25
Malleable and steel scrap	6.75 to 7.25
Railroad tank and sheet scrap	4.75 to 5.25

Birmingham

BIRMINGHAM, ALA., October 26, 1914.

Pig Iron.—With practically nothing doing, the open quotation for Birmingham district pig iron, applying also to Tennessee and northern Alabama furnaces, is \$10 for the remainder of the year and the first quarter of 1915. Special grades would bring a premium. One producer, with two active furnaces, had failed up to last Saturday to sell as much as one stack's make and another, with four furnaces active, had sold the make of one. Similar reports are heard all along the line. Foundry-iron stocks are reported as nearing 200,000 tons and still increasing. Hold-up orders continue. Nothing appears to have resulted from the reported inquiry of the Japanese government for tonnage. However, some iron is moving to Italy and billets to Scotland and England on, it is reported, old orders. A representative of one Alabama steel interest is in Great Britain now seeking business with old and new customers. The largest sale of foundry iron recently reported is one of 1000 tons for the Pacific coast, the price not being given. This iron will get a freight rate of \$1.75 to the coast and a steamship rate of \$5. The booking has been made with the new Frisco-Mobile line to be inaugurated in November. We quote, per gross ton, f.o.b. Birmingham furnaces (the higher figures being for special iron), as follows:

No. 1 foundry and soft	\$10.50 to \$11.75
No. 2 foundry and soft	10.00 to 10.25
No. 3 foundry	9.50 to 9.75
No. 4 foundry	9.25 to 9.50
Gray forge	9.00 to 9.25
Basic	10.00 to 10.25
Charcoal	23.50 to 24.00

Cast-Iron Pipe.—The water and gas pipe foundries continue to enjoy a fair business of the volume prevailing for some time, and desirable contracts are secured by shading quotations. The Middle and Far West are especially good customers, and some pipe will go to the Pacific coast. Sanitary pipe factories are still running slack, with little inquiry. We quote, per net ton, f.o.b. makers' yards, as follows: 4-in., \$20; 6-in. and upward, \$18.

Coal and Coke.—Coke shows no increase in the small supply. We quote, per net ton, f.o.b. oven, as follows: Furnace coke, \$2.60 to \$2.75; foundry, \$3 to \$3.25. The decrease in coal consumption may be measured from the report of the Alabama Car Service Association for September, which gives car movements as 65,000, against 95,000 in September, 1913, and 70,000 in August of this year.

Old Material.—Business is dull to the point of stagnation. However, dealers appear to be feeling a trifle more confidence in the steel outlook and are looking for steel scrap. We quote, per gross ton, f.o.b. dealers' yards, as follows:

Old iron axles	\$13.00 to \$13.50
Old steel axles	12.50 to 13.00
Old iron rails	12.00 to 12.50
No. 1 railroad wrought	8.50 to 9.00
No. 2 railroad wrought	7.50 to 8.00
No. 1 country wrought	8.00 to 8.50
No. 2 country wrought	7.00 to 7.50
No. 1 machinery cast	9.50 to 10.00
No. 1 steel scrap	8.00 to 8.50
Tram carwheels	8.50 to 9.00
Stove plate	8.00 to 8.50

St. Louis

ST. LOUIS, Mo., October 26, 1914.

Pig Iron.—A willingness has been evidenced on the part of some of the furnaces to take business at present prices for the first quarter of next year, the assumption apparently being that definite improvement is not to be expected before the turn of the year. Sales of the week included 300 tons of 8 per cent. silicon and 250 tons of No. 2 Southern foundry. An inquiry is still pending for 200 to 300 tons of No. 2 Northern iron.

Coke.—An inquiry for 2000 tons of furnace grade is still pending, but is expected to be closed shortly. By-product coke is dull, the quotation being about \$5 per net ton, St. Louis, but it is reasonably sure that this would be shaded in the case of a large tonnage.

Finished Iron and Steel.—A better feeling is developing, but nothing is being taken beyond the amount necessary to maintain agreed shipments. From warehouse there is somewhat free movement in minimum quantities, fabricators and others using these stocks at higher prices rather than commit themselves to contracts. We quote as follows for material out of stock: Soft steel bars, 1.70c.; iron bars, 1.65c.; structural material, 1.80c.; tank plates, 1.80c.; No. 10 blue annealed sheets, cold rolled, 2c.; No. 28 black sheets, 2.55c.; No. 28 galvanized, black sheet gauge, 3.55c.

Old Material.—Not even the dealers are buying except when especially attractive lots are to be had at well below the market figures. Relaying rails might sell if there were any to be had, but only in small quantities. Railroads are known to be withholding scrap for better prices. We quote dealers' prices, f.o.b. St. Louis, with the notation that the figures are nominal:

Old iron rails	\$10.50 to \$10.75
Old steel rails, rerolling	10.75 to 11.00
Old steel rails, less than 3 ft.	10.00 to 10.25
Relaying rails, standard section, subject to inspection	21.00 to 23.00
Old carwheels	10.50 to 10.75
No. 1 railroad heavy melting steel scrap	9.50 to 9.75
Shoveling steel	7.50 to 8.00
Frogs, switches and guards, cut apart	9.50 to 9.75
Bundled sheet scrap	4.50 to 4.75

Per Gross Ton	
Iron angle bars	\$9.50 to \$10.00
Steel angle bars	8.25 to 8.50
Iron car axles	16.25 to 16.75
Steel car axles	11.25 to 11.75
Wrought arch bars and transoms	10.50 to 11.00
No. 1 railroad wrought	7.50 to 7.75
No. 2 railroad wrought	7.50 to 7.75
Railroad springs	8.75 to 9.00
Steel couplers and knuckles	8.25 to 8.75
Locomotive tires, 42 in. and over, smooth	8.25 to 8.75
No. 1 dealers' forge	7.25 to 7.75
Mixed borings	3.50 to 3.75
No. 1 busheling	6.75 to 7.00
No. 1 boilers, cut to sheets and rings	5.25 to 5.75
No. 1 cast scrap	9.00 to 9.50
Stove plate and light cast scrap	7.75 to 8.25
Railroad malleable	7.50 to 7.75
Agricultural malleable	7.00 to 7.50
Pipes and flues	5.25 to 5.75
Railroad sheet and tank scrap	5.25 to 5.50
Railroad grate bars	6.75 to 7.00
Machine shop turnings	4.50 to 4.75

New York

NEW YORK, October 28, 1914.

Pig Iron.—It is evident that the average foundry is not buying, but inquiries for 200 to 400 tons come up here and there from New Jersey, Brooklyn and the Hudson Valley. The Lackawanna Railroad is in the market for 525 tons for delivery at Scranton. Buffalo furnaces were quite aggressive in the recent selling in New England, as low as \$12 at Buffalo furnace having been done for No. 2 X, though sales were also made at \$12.25 and somewhat higher. Buffalo iron is being pressed on the eastern Pennsylvania market and prices of furnaces in that district have been crowded down further. Some producers are out for orders for 1915 delivery, but they are the exception. The average producer takes the position that it is useless to try to get orders at prices which would be fixed by the present state of mind of buyers. In the past week the segments for the tunnel extensions in Brooklyn on the Flynn & O'Rourke contract have been let, 11,000 tons going to the Davies & Thomas Company at Catasauqua, Pa., while the remaining 11,000 tons was divided between the New York Car Wheel Company and the Wheeling Mold & Foundry Company, these companies having taken the original contract. It is understood that the pig iron has been bought, deliveries extending over nearly two years. We quote Northern iron for tidewater delivery as follows: No. 1 foundry, \$14.50 to \$14.75; No. 2 X, \$14.25 to \$14.50; No. 2 plain, \$13.75 to \$14. Southern iron is quoted at \$14.75 to \$15 for No. 1 and \$14.25 to \$14.50 for No. 2.

Ferroalloys.—There is no interest in the market for 80 per cent. ferromanganese, sales and inquiries both being practically nil. Quotations still remain at \$68, seaboard. Inquiries for export are persistent, but only for small quantities, on which the regular quotation is understood to rule. The source of these inquiries is said to be from various countries, such as Sweden, Russia, Australia, etc., and the intimation has been heard that some of it might ultimately reach German consumers, but it was not learned that any of these inquiries had developed into orders. Ferrosilicon, 50 per cent., is selling at \$71 to \$73, Pittsburgh, according to quantity.

Finished Iron and Steel.—A quiet letting of 600 tons of 85-lb. rails and the closing of 8700 tons of structural material, as listed below, are encouraging notes of another lean week in the finished steel business. Weakness in prices is pronounced; more small lots of plates have gone at 1.10c., Pittsburgh, and even 1.05c., Pittsburgh, in some special cases, and there are rumors, though unconfirmed, of quotations of 1.10c. on small lots of structural material. More passenger car inquiries have appeared, but the sum total of freight cars regarded as likely to develop into business does not exceed 600. Of promising structural work yet to be placed main interest centers in 2700 tons for a loft building, Thirty-fifth street and Broadway, for the Thompson-Starrett Company, general contractor, likely to be settled in the week, and 1100 tons for the Evander-Childs high school has again come into the market, and another new project is 600 tons for the Standard Arcade building, 50 Broadway. Structural lettings include 3700 tons for the Essex power house, to the Lackawanna Bridge Company; 1000 tons for the Colony Club, reported awarded to the Levering & Garrigues Company; 450 tons for the Union National Bank, Scranton, to the American Bridge Company; 800 tons for the barge canal, to the Phoenix Bridge Company; 400 tons for a Women's Civil War Memorial building, Washington, to the American Bridge Company; 150 tons for the Winchester Repeating Arms Company, New Haven, to the Berlin Construction Company; 500 tons for an addition to the Rockefeller Institute, to Post & McCord; 150 tons for the Goelet building, Fourth avenue, to George A. Just Company, and 1500 tons to the Hinkle Iron Company for the following: 900 tons for the Fullerton-Weaver Apartment, 400 Park avenue; 400 tons for school No. 55, Bronx, and 250 tons for the Talmud-Torah school. We quote mill shipments of steel bars and shapes at 1.15c. to 1.20c., Pittsburgh, or 1.31c. to 1.36c., New York; steel plates at 1.10c. to 1.15c., Pitts-

burgh, or 1.26c. to 1.31c., New York, and iron bars at 1.25c., New York. For lots from store we quote iron and steel bars at 1.80c. to 1.85c., New York, and plate and structural material at 1.85c. to 1.90c.

Cast-Iron Pipe.—No public lettings are in sight in this immediate district. It is getting late in the season and it is also likely that difficulty in making financial arrangements has something to do with the lack of business of this character. In view of these conditions it is somewhat remarkable that more inquiries are being received from private buyers than might ordinarily be expected at this time. Export trade is not developing to the extent promised some time ago, the prospect for South American orders being befogged by the unfavorable financial condition of business interests in that part of the world. Prices continue low. Carload lots of 6-in. are about \$20 to \$20.50 per net ton, tidewater.

Old Material.—About the only transaction worthy of note was a sale of 1000 tons of heavy melting steel scrap to Coatesville, Pa., at \$9.50, delivered. The rolling mills are taking almost nothing, while foundries are purchasing quite small quantities of cast scrap. The outlook continues exceedingly unfavorable and lower prices are expected. Dealers' quotations, which are nominal, are as follows, per gross ton, New York:

Old girder and T rails for melting	....	\$7.25 to	\$7.50
Heavy melting steel scrap	....	7.25 to	7.50
Relaying rails	....	19.50 to	20.00
Rerolling rails	....	8.50 to	9.00
Iron car axles	....	14.50 to	15.00
Steel car axles	....	10.75 to	11.25
No. 1 railroad wrought	....	9.00 to	9.50
Wrought-iron track scrap	....	8.50 to	9.00
No. 1 yard wrought, long.	....	8.00 to	8.50
No. 1 yard wrought, short.	....	7.25 to	7.50
Cast borings	....	5.50 to	6.00
Wrought turnings	....	5.25 to	5.75
Wrought pipe	....	7.25 to	7.75
Carwheels	....	8.50 to	9.00
No. 1 heavy cast, broken up	....	9.50 to	10.00
Stove plate	....	7.25 to	7.50
Locomotive grate bars	....	6.00 to	6.50
Malleable cast	....	6.75 to	7.25

British Trade Continues Dull

American Steel Makers Refuse Good Bids for First Quarter

(By Cable)

LONDON, ENGLAND, October 28, 1914.

Pig iron is very dull, but there is a steadier feeling now, though much disappointment is felt at the poor position of trade in America. The number of furnaces in blast in the three districts is 164, against 190 last year. Stocks of pig iron in Connal's stores are 107,725 tons, against 106,649 last week. The semi-finished steel situation is uncertain. America has refused good bids for January to March, but solicits bids for this year. British makers are keen to book business, though Welsh works will not quote below £5, delivered locally. Finished steel is featureless. Tin plates are slightly steadier, owing to the advance in tin, but there is hardly any improvement in buying, though some oil sizes were sold for Japan. Such quotations as are available are as follows:

Tin plates, coke 14 x 20, 112 sheets, 108 lb., f.o.b. Wales, 12s. 7½d. (\$3.07).

Cleveland pig iron warrants (Tuesday), 49s. 3d. (\$11.98), against 49s. 6½d. (\$12.05) last week.

No. 3 Cleveland pig iron, makers' price, f.o.b. Middlesbrough, 50s. (\$12.17), against 49s. 9d. (\$12.10) last week.

Steel black sheets, No. 28, export, f.o.b. Liverpool, £8 17s. 6d. (\$43.19), against £9 2s. 6d. (\$44.40) last week.

Steel ship plates, Scotch, delivered local yards, £6 15s. (\$32.84), against £7 (\$34.06) last week.

Steel rails, export, f.o.b. works port, £6 2s. 6d. (\$29.80).

Hematite pig iron, f.o.b. Tees, 63s. (\$15.33), against 64s. (\$15.57) last week.

Sheet bars (Welsh), delivered at works in Swansea Valley, £4 15s. (\$23.12), against £5 (\$24.33) last week.

Steel joists, 15 in., export, f.o.b. Hull or Grimsby, £6 10s. (\$31.62).

Steel bars, export, f.o.b. Clyde, £7 (\$34.06).

Exports Greatly Cut Down—Sheet Bars Weaker —Chances of American Steel

LONDON, OCTOBER 16, 1914.

There is little or no satisfaction to be derived from a review of the iron and steel position here. The Cleveland market has been gravely overclouded by lack of information from the Continent as regards the Allied forces, and by a censorship which involves withholding even the commonplaces of news. There is not the least chance of things industrial getting better until the war news affords more ground for comfort than is the case to-day, and until the press is permitted to allude to the hostilities and to events connected with them without submitting everything first to the censor's pencil. You probably know a good deal more than we do—you cannot know less. Under these circumstances the tone of the iron and steel markets has been poor. The reopening of the Glasgow market a month ago was a very plucky attempt to restore normal conditions, but it has not found any imitators, and in London the markets are persistently closed. It is indeed impossible to reopen here, and as a matter of fact additional restrictions have been imposed upon trading this week. By a resolution of the exchange, all public and private trading in iron, copper and tin warrants is forbidden under severe penalties, pending further notice, unless transactions are continuations of realizations of existing engagements. This puts the lid on trading in London, but the step was no doubt necessary in the interest of the trade here at large, for there had been attempts to depress prices to a serious extent, and the position was already sufficiently difficult without additional trouble being created by bear tactics.

ACTIVITY IN ADMIRALTY REQUIREMENTS

Actual business in Cleveland iron is at a deadlock, and the few sales reported are merely small lots to fill immediate needs. There are one or two inquiries for Italy, but they do not amount to much, and the general revival of the export business is utterly impossible for a long time, even under the most favorable circumstances. A spirit of the utmost caution prevails and definite news which is to be relied upon, of a favorable character for the Allies is awaited with anxiety, but confidence. Until something of the sort is forthcoming the markets are bound to reflect an uncertain frame of mind. The starch has all gone out of hematite and sales have been made even into the first half of next year at 64s. 6d. (\$15.69) f.o.b. Middlesbrough for East Coast sorts. Makers were very reluctant to make concessions, but the price had to come down. The main buying of hematite has been in connection with War Office and Admiralty requirements. That section of the steel trade which is most devoted to the armament department has nothing to complain about, for there is a never ending flow of business. Not much is doing in the general merchant trade, however, and a distinct falling off in the bookings from the early part of August is to be noted.

SMALL ORDERS FOR AMERICAN SHEET BARS

A little American half-finished material has been sold, but nothing of importance. Indeed it is hard to find any business worth mentioning though this week cables have come to London merchants from America soliciting bids for skelp, billets, sheet bars and so forth. It is doubtful, however, if American makers are prepared to accept such prices as our own people are taking—say £5 for Welsh sheet bars delivered at local works. Of course America could not get this figure, and 95s. (\$23.12) c.i.f. or so is not a very fat price. Wales is selling into the Midlands at 105s (\$25.55) delivered for billets and sheet bars, and this price America certainly at present would not touch. It is, however, the general anticipation that United States steel works will soon be in the market here as regular sellers. At all events steel men just here from your side, talk as if they intended to make a bid for a steady and regular export trade in Europe. We have got somewhat inured to these tales; but all things seem now to be in the melting-pot, and with entirely altered con-

ditions growing up, we may all have to take a fresh view and revise old conceptions.

The irruption of Canadian competition for steel rails has been viewed with much disfavor. This concern made a dash to pull off the big Australian and South African orders, putting in a very low bid, but English works went below £6 and booked the business.

Boston

BOSTON, MASS., October 27, 1914.

Old Material.—The dealers have marked down their quoted figures of prices, but the change has little meaning, for transactions are very few and such business as is being done is in small quantities. Consequently, prices continue wholly nominal. The quotations given below are based on prices offered by the large dealers to the producers and to the small dealers and collectors, per gross ton, carload lots, f.o.b. Boston and other New England points which take Boston rates from eastern Pennsylvania points. Mill prices are approximately 50c. per ton higher.

Heavy melting steel	\$7.00 to \$7.75
Low phosphorus steel	13.75 to 14.75
Old steel axles	12.75 to 13.25
Old iron axles	20.25 to 20.75
Mixed shafting	12.00 to 12.25
No. 1 wrought and soft steel	8.25 to 8.75
Skeleton (bundled)	5.50 to 5.75
Wrought-iron pipe	7.00 to 7.50
Cotton ties (bundled)	5.25 to 5.75
No. 2 light	3.25 to 3.75
Wrought turnings	5.00 to 5.50
Cast borings	5.00 to 5.25
Machinery cast	10.75 to 11.00
Malleable	7.50 to 7.75
Stove plate	7.00 to 7.50
Grate bars	5.25 to 5.50

Metal Market

NEW YORK, October 28, 1914.

The Week's Prices

Cents Per Pound for Early Delivery

Copper, New York	Lead			Spelter	
	Electro-	Tin,	New	St.	New
	Lake	New York	St.	St.	St.
Oct.					
21	11.50	11.25	30.50	3.50	3.35
22	11.50	11.12 $\frac{1}{2}$	31.50	3.50	3.37 $\frac{1}{2}$
23	11.50	11.12 $\frac{1}{2}$	31.45	3.50	3.37 $\frac{1}{2}$
24	11.50	11.25	31.25	3.50	3.37 $\frac{1}{2}$
26	11.50	11.25	31.25	3.50	3.37 $\frac{1}{2}$
27	11.50	11.25	30.75	3.50	3.37 $\frac{1}{2}$

There has been good buying of copper, but prices are at the level of a week ago. Moderate buying and other influences have sent tin higher. Lead has been active and quotations are stronger. Spelter has been sustained by large exports. Foreign demand has caused antimony to advance.

New York

Copper.—In the latter part of last week the tonnage of orders booked from both domestic and foreign buyers was the largest recorded in some time. American consumers took hold in a lively way, while the shipments to neutral countries were heavy, a large part of the metal being intended for Germany. Up to October 27, exports totaled 22,183 tons. The foreign shipments were made despite the fact that England has held up several ships having copper in their cargoes, the shippers figuring that they could not lose. If the metal can be delivered to Germany, where there is a scarcity, a premium will be readily paid for it, while if England takes possession of it she will, according to her agreement, eventually pay for it. A good part of the foreign shipment has been going to Italy and two shipments en route to that country have been held up by England. The lowest figure at which business was done in the buying movement referred to was 11.12 $\frac{1}{2}$ c., cash, New York, from which the market advanced to 11.25c., cash, New York, where it stood yesterday. In Lake copper, which was quoted yesterday at 11.50c., there has been but little doing except for special brands for which ammunition makers are willing to pay a premium.

Tin.—The market advanced and then tapered off again. On October 21 excitement was caused by the report which was later confirmed that the German cruiser Emden had sunk the steamer *Troilus*, which

with 850 tons of tin, had sailed shortly before from Singapore. The market advanced sharply to 30.50c. on that day and closed with 30.75c. asked. More business could have been done if there had been more sellers. Some of the latter had become buyers instead. The market was active October 22, sales running up to about 300 tons, mostly in futures. Spot and early arrivals were quoted on that day at 31.50c. On October 23 the market was dull with sellers holding early in the day to 31.75c., but the lack of business caused a decline to 31.37½c. October 26 and 27 were quiet days and yesterday the spot quotation was down to 30.75c. While supplies are not over abundant, there is sufficient to meet the present demand. The arrivals this month total 2018 tons and there is afloat 1805 tons.

Lead.—The market has been strengthened by active buying which apparently was brought about by the curtailment of output in Missouri and elsewhere which convinced consumers that it would be well for them to take metal at the present low prices. The New York quotation, 3.50c., has not changed, but St. Louis is 2½ points higher at 3.37½c. Exports have gone ahead steadily.

Spelter.—Inquiries for export were followed by large sales, and the quantity exported this month is considerably over 5000 tons. Domestic consumers have not been active buyers, which has caused some irregularity in quotations. Quotations yesterday were 5.10c. to 5.15c., New York, and 4.95c. to 5c., St. Louis.

Antimony.—The situation is unusual in antimony in view of the shipments to Europe, especially to Russia, which endeavored to get all of the metal it could. It is estimated that in two weeks 2200 tons were exported to that country. Inasmuch as imports will be curtailed, it is considered likely that there may be a squeeze here before the end of this year. Chinese antimony for spot delivery has been selling in bond at 14c., but December and January deliveries are quoted at about 9½c. Quotations range as follows: Hallett's, 15c. to 16c.; Cookson, 16c. to 17c. and Chinese and Hungarian, 14c. to 15c.

Old Metals.—The market continues quiet. Dealers' selling prices are nominally unchanged as follows:

	Cents per lb.
Copper, heavy and crucible	11.00 to 11.25
Copper, heavy and wire	10.75 to 11.00
Copper, light and bottoms	9.75 to 10.00
Brass, heavy	8.25 to 8.50
Brass, light	6.25 to 6.50
Heavy machine composition	10.50 to 10.75
Clean brass turnings	7.50 to 7.75
Composition turnings	9.25 to 9.50
Lead, heavy	3.25
Lead, tea	3.00
Zinc scrap	3.50

Chicago

OCTOBER 26.—Despite the fairly liberal buying of copper, the trade seems to feel that production continues more rapidly than the output is absorbed and prices show little ability to respond. Tin quotations jumped on the strength of reports of considerable quantities lost in transit and spelter prices have again advanced to the 5c. level. We quote as follows: Casting copper, 11.75c.; Lake copper, 12c., for prompt shipment; small lots, ½c. to ¼c. higher; pig tin, carloads, 32c.; small lots, 35c.; lead, desilverized, 3.42½c. to 3.47½c., and corroding, 3.75c., for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 5c.; Cookson's antimony, 16c. for cask lots; other grades, 12c. to 14c. On old metals we quote buying prices for less than carload lots as follows: Copper wire, crucible shapes, 10c.; copper bottoms, 8.50c.; copper clips, 9.50c.; red brass, 9c.; yellow brass, 6.50c.; lead pipe, 3.10c.; zinc, 3.50c.; pewter, No. 1, 22c.; tinfoil, 25c.; block tin pipe, 27c.

St. Louis

OCTOBER 26.—There has been some improvement in the Missouri metals, with increased transactions at advances. Lead is quotable at 3.35c. to 3.40c.; spelter, 4.90c.; tin, 34c.; Lake copper, 13c.; electrolytic copper, 12.90c.; Cookson's antimony, 15c. In the Joplin ore market there was an improvement, particularly on the lower grade ores. The basis range for 60 per cent. zinc ore was \$39 to \$41 per ton, with premium ores commanding as high as \$44. Calamine was rather dull,

with the basis range for 40 per cent. at \$19 to \$21, and settlements for the choicest up to \$25. Lead ore continued weak at \$40 for 80 per cent. Miscellaneous scrap metals are quoted as follows: Light brass, 5c.; heavy yellow brass, 7c.; heavy red brass and light copper, 8.50c.; heavy copper and copper wire, 9.50c.; lead, 3c.; zinc, 3c.; tea lead, 3c.; pewter, 20c.; tinfoil, 26c.

Iron and Industrial Stocks

NEW YORK, October 28, 1914.

Three months have passed since the closing of the New York Stock Exchange. While no time has yet been fixed for its reopening, conditions are rapidly becoming more favorable for such action. Last week, for the first time since the outbreak of the war in Europe, the New York Clearing House average figures showed cash holdings by the local banks in excess of the usual requirements. A surplus is reported of \$8,460,650. This fact is regarded in financial circles as unmistakably demonstrating the noteworthy progress which has been made in strengthening the banking position in this city recently. Another favorable development has been the sharp decline in foreign exchange, which gives substantial evidence of the confidence now growing in banking quarters that the foreign exchange situation is in a fair way to right itself. These are essential preliminaries to the establishment of conditions making it reasonably safe to resume trading on the Stock Exchange. No authoritative quotations are yet available on iron and industrial stocks.

Dividends

The National Lead Company, regular quarterly, 1% per cent., on the preferred stock, payable December 15.

The American Brass Company, regular quarterly, \$1.50 a share, payable November 2.

The Taylor-Wharton Iron & Steel Company, regular quarterly, 1½ per cent. on the preferred stock, payable November 2.

The Cambria Steel Company, regular quarterly, 1½ per cent., payable in scrip dated November 14, 1914, and redeemable in cash in two years, with interest at 5 per cent. per annum. The regular cash dividend has been 1¼ per cent. quarterly.

The J. G. Brill Company, 1 per cent. on the preferred stock, payable November 2. This is a reduction in the rate for the quarter of ¼ of 1 per cent.

The International Harvester Corporation, regular quarterly, 1½ per cent. on the preferred stock, payable December 1.

The International Harvester Company of New Jersey, regular quarterly, 1½ per cent. on the preferred stock, payable December 1.

The Lackawanna Steel Company, regular quarterly, 1½ per cent. on the preferred stock, payable December 1.

The Warwick Iron & Steel Company, regular semi-annual, 3½ per cent., payable November 14.

The Colorado Fuel & Iron Company has again passed the quarterly dividend on its \$2,000,000 of 8 per cent. cumulative preferred stock. No dividend was paid July 1.

The Standard Sanitary Mfg. Company, regular quarterly, 1½ per cent. on the common stock and 1½ per cent. on the preferred stock, both payable October 24.

The Stewart-Warner Speedometer Corporation, regular quarterly, 1½ per cent. on the common stock and 1½ per cent. on the preferred stock, both payable November 1.

The United States Steel Corporation, regular quarterly, 1½ per cent. on the preferred stock, payable November 28. The declaration on the common stock is ½ of 1 per cent., payable December 30. This is a reduction of ¼ of 1 per cent. since the previous quarterly payment.

The report that the Crucible Steel Company of America, Pittsburgh, had received an order for 5000 tons of bayonet and saber steel is officially denied.

THE STEEL CORPORATION SUIT

Arguments Before the Circuit Court at Philadelphia in the Great Dissolution Suit

Oral argument has been proceeding since Tuesday, October 20, before the United States Circuit Court of Appeals, Philadelphia, in the suit brought by the Government for the dissolution of the United States Steel Corporation. It was opened by Jacob M. Dickinson, who has been in charge of the Government's side of the case since it was instituted in October, 1911.

Mr. Dickinson began his argument by giving an account of the conditions prevailing in the American iron and steel industry about 20 years ago. He spoke of the sharp competition then existing and of the formation of pools and agreements among manufacturers for the purpose of keeping up prices and how one steel company absorbed another, resulting finally in the formation of the Steel Corporation. He named five great interests which came together for this purpose headed by the late J. P. Morgan, Andrew Carnegie, the Moore Brothers, John W. Gates and John D. Rockefeller. He went into much detail to show how the corporation's capital of more than \$1,400,000,000 was made up, charging that more than \$500,000,000 of this was water. He told how the Steel Corporation and its subsidiaries maintained prices, stating that the men at its head restrained trade in every way possible and crushed out competitors. He brought in the famous Gary dinners, at which he said that about 90 per cent. of the iron and steel manufacturers of the country would meet and that a general understanding would be reached to maintain prices. He quoted freely from letters and minutes of Corporation meetings. Continuing his argument on the following day, he claimed that through its interlocking directorates the Steel Corporation was in direct touch with the large railroads and steamship companies and with the overwhelming majority in money and power of the banks and trust companies of the country. He dwelt strongly on the alleged power of the Steel Corporation to destroy competitors. He summed up by asserting that since its formation it had controlled and still controlled the greater part of the steel business of the United States, directing its power primarily to the exactation of non-competitive prices from the general public rather than to the destruction of its competitors. He said, "It has made its competitors co-conspirators with it in the artificial maintenance of prices of steel products."

Richard D. Lindabury, speaking in defense of the corporation, followed Mr. Dickinson on October 21. He asserted among other things that the United States Steel Corporation was a law-abiding institution; that its organization had had a beneficial effect on the business life of the country; that it had toned up and steadied the iron and steel industry of the country; that it had built up a wonderful foreign trade, and that it was not formed to create a monopoly or to suppress competition. He said that unless it could be proved that the Steel Corporation at the time the suit was filed was restraining trade the case falls to the ground. He referred to Mr. Dickinson's statement that five great groups of financial and industrial interests had combined to form the Steel Corporation as a "picture of the imagination." He said there was no thought in the mind of Andrew Carnegie when he sold his interest in his company to the new corporation that a monopoly was to be created. He denied that the Steel Corporation was overcapitalized. Mr. Lindabury continued his argument on October 23, reviewing in detail the story of the absorption of the Tennessee Coal, Iron & Railroad Company. He said that instead of apologizing for the Gary dinners, the Steel Corporation is exceedingly proud of them. "They are a laurel crown in the history of the industry." Judge Gary had thus called together the manufacturers to exchange views and to prevent wide and sudden fluctuations in prices that would bring ruin to every one in the business. As a result of these gatherings in the dark days of the panic of 1907 there was not one failure in the iron and steel trade for the first time in the history of panics. He said that no prices were fixed at these dinners as

alleged by the Government, nor was territory allotted or output limited. He said that the record in the case did not show a single instance of rebates having been asked or received by the concern or by any of its subsidiaries; that no competitor anywhere has charged the corporation with unfair methods or with underselling in particular districts; that the corporation had not attempted to coerce consumers or dealers into trading with it exclusively, nor had it otherwise restricted their freedom of action. He said, "If there ever was a record of clean doing and honorable business methods, we have it here."

On October 23, Henry E. Colton, special assistant to the Attorney General of the United States, gave his attention to arguments showing that the corporation violates the Sherman anti-trust act. He called the attention of the court to price tables which quoted uniform prices for certain finished products for a period of years, claiming that the lack of fluctuations was an indication that the Steel Corporation maintained artificial prices and it also indicated a lack of competition. The maintenance of high prices year after year was an indication, he said, that the corporation had a powerful influence in the trade and that it actually monopolized business to a great extent. He attacked some of the statements of the corporation's witnesses with regard to the percentage of the country's business now controlled by the corporation, contending that its share of the Bessemer steel business is 60 per cent.; open-hearth, 57 per cent.; wire nails, 49 per cent.; tin plate, 61 per cent.; of the country's steel and iron business as a whole, 48.52 per cent. Alluding to the argument by the defense that the Steel Corporation's percentage of the iron and steel business of the country had decreased, he claimed that, while the Steel Corporation had the power to increase its percentage, it chose to maintain high prices, one of the things that the Sherman anti-trust law says is illegal. He asserted that the traffic minutes of the Steel Corporation were burned before the investigation leading up to the present suit was begun, and added that if these documents had remained in existence the Government assuredly would have sought to learn whether the Steel Corporation had violated the law by soliciting and receiving rebates. In making this statement, he said, he did not want to imply that the law was so violated. Mr. Colton concluded his argument on Monday, October 25. He asserted that the Steel Corporation sold products in foreign markets at prices greatly lower than in the United States, and claimed that this was an indication that it intended to keep up excessive prices at home. He said that if the corporation had been honest with the public it would have disposed of its surplus product in the United States at the lower prices.

David A. Reed, of counsel for the Steel Corporation, opened his argument with a tribute to Mr. Carnegie for his philanthropic work. He went over the testimony of witnesses to show that it was virtually impossible to monopolize the ore supply of the Lake Superior region. In discussing the uniformity of prices he criticised the Government for taking as a basis for comparison the years 1897 and 1898 when steel prices were the lowest in our history.

A development of the day was the announcement by the Government's attorneys that in view of the cancellation of the lease by the Steel Corporation of the Great Northern Railway ore deposits in the Lake Superior district, the Government's action against 18 ore land companies controlled by the Great Northern had narrowed down to a question of the costs in the present suit. Counsel for the ore interests, however, announced that the Great Northern would oppose a decree assessing costs against the ore companies on the plea that such action would brand these companies and officers connected with them as violators of the anti-trust law. Another important reason for opposition, counsel said, was that under the Clayton anti-trust act just passed, a third person could use the decree and it would lie as *prima facie* evidence in any proceeding he might bring for triple damages under the Clayton act for alleged injury to his business by reason of the lease if the court decreed it was unlawful. This is probably the first court proceeding in which the new Clayton law has come under discussion.

Moose Mountain Iron Ores of Canada

"The Moose Mountain Iron-Bearing District of Ontario," by E. Lindeman, is the subject of a report recently issued by the Canadian Department of Mines of which Dr. Eugene Haanel is director. This district has attracted considerable attention on account of its large deposits of low grade magnetite. The ores are divided into two types—banded quartziferous magnetite and magnetite associated with hornblende, pyroxene and epidote. The former is the most common, while the latter is confined to one or two small deposits.

The total area of the various deposits is roughly estimated at 3,256,000 sq. ft., which, assuming that the specific gravity of the ore is 3.8, would correspond to about 38,665,000 tons of ore per 100 ft. of depth of the ore bodies. Diamond drilling carried out by the Moose Mountain, Ltd., has shown that No. 2 deposit is at least 400 ft. deep, while No. 1 deposit has been proved to a depth of 300 ft. The great bulk of this large tonnage is made up of banded silicious magnetite, of type No. 1, requiring fine crushing and concentration, with subsequent briquetting or nodulizing. The future of the district as an iron ore producer depends chiefly on the possibility of utilizing the type No. 1 ore. Concentration tests have demonstrated that by grinding the material to 80 to 100 mesh or finer an excellent concentrate having the following composition can be obtained: Iron 65.6 per cent., phosphorus 0.019 per cent., silica 8.6 per cent., sulphur 0.029 per cent. The cost of mining the ore will, no doubt, for years to come, be rather low, owing to the fact that a large tonnage can be obtained from No. 2 deposit by simply quarrying the ore in open cuts at various elevations. Cheap electric power is now available, being obtained from Wahnapitae Power Company, over a transmission line of about 35 miles in length.

The report concludes with the statement: "Since it will be necessary to mine and crush to a fineness of 80 to 100 mesh about 2.2 tons of ore to obtain one ton of concentrate of 65 per cent. iron, and adding to the cost of mining, crushing and concentration that of briquetting, which by the Grondal process is rather high, it is evident that only by the most economical handling of the material on a large scale will it be possible at the present time to work these low grade ores profitably."

A house organ has been established by the Richmond Radiator Company, 1480 Broadway, New York City, under the name of the Richmond Reporter. It illustrates the company's five plants, located at Uniontown, Pa.; Reading, Pa.; Philadelphia, and Norwich, Conn., for manufacturing radiators, heating boilers, bathtubs, lavatories and other sanitary enameled ware and portable and stationary vacuum cleaners. A brief history of each plant is given.

The National Conduit & Cable Company, 41 Park Row, New York, in its circular entitled "Copper Gossip," issued under date of October 20, refers to the very low price at which copper is now being sold, and adds: "On the basis of current market quotations there is an extraordinary opportunity to put copper to all practical uses possible, notably for domestic account."

Advices are that the business in house-heating furnaces in the Central West has not fallen off greatly in 1914 from the volume of 1913. In the East, however, the furnace trade is considerably less than last year's. The stove manufacturers of the Central West report that the demand thus far has been from 15 to 20 per cent. less than in 1913.

The recent discovery of valuable deposits of red hematite iron ore at Lund in the parish of Dalene, Norway, is announced. Several analyses show an iron content of 62 to 67 per cent. An English company contemplated the purchase and development of the property but the plan was abandoned because of the war.

Electric Drive in an English Sheet Mill

Early last year the Ebbw Steel, Iron & Coal Company, Ltd., Ebbw Vale, Monmouthshire, England, erected at Victoria a mill of 500 tons weekly capacity of corrugated galvanized sheets. The mills are arranged down the center of the rolling bay, with three mills and one set of cold rolls on each side of a central drive. The drive is electric through single reduction gearing on a three-phase 50-cycle 2000-volt induction motor, giving 1000-brake horsepower at 184 r. p. m. According to a recent description of the mill in *Engineering*, of London, the motor drives a pinion of 3 ft. 10 in. diameter through a Reich flexible coupling, and this pinion gears into a spur wheel 21 ft. 10% in. in diameter, mounted on the main mill shaft. The main shaft also carries a 160-ton flywheel 30 ft. in diameter.

With the motor running at its normal speed, the speed of the rolls is about 32 r.p.m. In order to give some regulation, however, and to allow the rolls to be run more slowly, a liquid slip-regulator and starter is fitted in connection with the motor, which allows it to be run continuously at 15 per cent. below synchronous speed. The regulator and starter consists of three tanks, connected respectively to the three slip-rings and mounted in a cast-iron frame. In the tanks are three electrodes, which are raised and lowered by a common hand-wheel, and are so arranged that the rotor circuit is never broken. The regulator is provided with straight wrought-iron cooling pipes, and is capable of dissipating 220 hp. continuously. A recording and indicating tachometer is driven from the motor shaft and records the fluctuations in the speed, while an alarm device is fitted in connection with it, which sounds a bell in case the motor speed drops below a predetermined value.

In addition to the main drive the mill is fitted with a barring gear driven by a 40-hp. slip-ring motor working from a 550-volt three-phase circuit at 360 r.p.m. The barring gear operates on the flywheel, and is arranged so that it automatically falls out of gear when the mill motor speeds up.

The whole of the electrical apparatus was supplied by the British Westinghouse Electric & Mfg. Company, Ltd., Trafford Park, Manchester. The product consists of sheets up to 40 in. wide by 10 ft. long, and from No. 10 to No. 31 gauge in thickness. The tachograph records show that the motor is always operating close up to its full capacity, and that prolonged periods of overload are not uncommon.

The Western Scrap Iron Dealers' Association met at the Hotel LaSalle, Chicago, on the evening of October 20, and adopted a new name more in keeping with the national scope of the organization. It is now to be known as the National Scrap Iron Dealers' Association. In connection with liability insurance for dealers who operate yards, steps were taken looking to a concentration of the insurance covering association members to the end that a much lower rate be secured than now obtains with this business scattered among many companies. The association also considered the question of demurrage. It is hoped that scrap cars may share in the credits allowed against demurrage with other shipments received by scrap consumers.

The suit brought by the Hess-Bright Mfg. Company, Philadelphia, Pa., against Fichtel & Sachs, Schweinfurt a Main, Germany, J. S. Bretz Company, New York City, American agent, for infringement, was decided in favor of the plaintiff, by the United States Circuit Court of Appeals on October 7. The decision sustains the basic Conrad patent, the essential features of which are an uninterrupted ball track or way and an overhang of the groove sides.

The Hydraulic Pressed Steel Company, Cleveland, Ohio, has established a concrete form department and is placing on the market two types of concrete forms, one an all-steel form and the other a combination of steel and wood. The forms will be manufactured for subways, sewers, mine shafts, tunnels, retaining walls, houses, culverts, flat segment arches, beams, girders, columns, tanks, bridges and manholes.

United States Banks in South America

Definite Data on the Handling of Credits Brought Out in Discussion at the Machine Tool Convention

The paper of Vice-president H. R. Eldridge of the National City Bank of New York on "The Establishment of American Banking Facilities in South America," as read before the Machine Tool Builders' Association in New York, October 22, brought forth a most interesting discussion, which was chiefly a prolongation of Mr. Eldridge's remarks, but on lines in part suggested by questions from his audience. Thus there were brought out just the facts manufacturers want most to know about the credit and banking side of business with South American countries.

In his address Mr. Eldridge said in part: That we could sell goods in South America in liberal quantities at this time is more than probable in view of the disrupted relations necessarily caused by the war, but that we would be justified in granting the long terms of credit to which they are accustomed is not so clear. These long terms of credit are directly the result of keen competition and are likewise responsible in no little degree for the financial conditions there prevailing.

DANGERS OF LONG CREDITS

All leniency should be shown in granting credit to responsible concerns, but when those terms go beyond the bounds of reason the road is paved toward the slough of speculation. If a merchant buys on six months' time an article which will be sold and realized upon within 90 days, he holds in his hands the proceeds 90 days longer than he should, and the temptation is constantly before him to either buy more goods, often beyond his needs, or to employ the funds in some line of speculation, both leading to undue expansion and often to financial failure. It would be well, therefore, not to be too liberal in terms of credit, even though the development of trade be retarded thereby, yet not unreasonably chary of granting terms of a favorable nature when conditions justify.

The National City Bank of New York will open at Buenos Aires, Argentina, a branch, and as soon as practicable another at Rio de Janeiro, Brazil. The bank desires to do all it can to promote the increase of trade relations and through its banking department offer a cheap and effective method of handling the exchanges between buyers and sellers. It is fully alive to the inconvenience probable exporters and importers suffer by the lack of dependable information of trade conditions, demands for certain lines of goods, shipping requirements, custom house regulations and dues, a knowledge of the products of the various countries which could be imported in the United States to advantage, their character and the avenues through which they could best be had, and the numerous other branches of information so requisite for the proper handling of business obtainable. To permit of the dissemination of such information among American exporters and importers it is the bank's intention to maintain a corps of trade experts at each branch whose duty it will be to gather all the data possible that can be of benefit and to make it available in an intelligent manner through the columns of *The Americas*, which will be issued from time to time, and special bulletins when deemed advisable. Information of this character will no doubt be found quite valuable and may possibly prove the source of no little saving of expense to houses operating in South America. The service of this corps will be available to American merchants and special reports can

be arranged for where desired. The bank will establish in each branch a credit department and hopes within a reasonable time to be able to furnish exporters and importers valuable information as to the standing of South American dealers.

The Discussion

S. H. Reck, Greaves-Klusman Tool Company, Cincinnati, started an important discussion when he said: I think that the question every one of us would like to ask of Mr. Eldridge is, How we are going to have our sales in South American countries handled? We understand that German and English bankers have afforded exceptional facilities to German and English manufacturers and merchants for disposing of their goods in these markets, which are so far away that the individual manufacturer in most cases would find it extremely difficult, almost you might say impossible—except in the case of such great concerns as the General Electric, the Westinghouse, or the International Harvester—to satisfy themselves as to whether credits should be justly extended. It would seem, therefore, that that function of the American bank that would best serve us would be to pass upon the credits themselves. If the branch banks in those countries were to be merely offices through which discounts can be handled holding the American shipper primarily responsible, the offices of the bank will not be very helpful to us, and the American trade with those countries will not be greatly stimulated thereby. But if that bank is to perform the real function of a bank, to be an institution to which the purchaser in those markets who is worthy of credit can go and obtain funds with which to make purchases in this country, paying for the goods or obtaining an extension of the time necessary to pay for them from the American bank, then the American manufacturer and merchant will be aided in exactly the manner that the English and the German manufacturer have been helped in past years by German and by English banking institutions. If Mr. Eldridge can give us the results of the investigations he has been making as to how credits and discounts will be handled—if, for instance, one of us were to sell a bill of \$10,000 worth of machine tools to a house in Buenos Aires or Sao Paulo, whether we will be held responsible for the time we give or whether the bank will establish the credit basis and finance the transaction—that is what we would all like to hear very much.

DETAILS OF THE BANKING PRACTICE

Mr. Eldridge: If you are entirely satisfied with the responsibility of the party to whom you are shipping you will be willing to sell him on ordinary terms of a draft payable in 60 or 90 days upon the firm itself. In that case, of course, you are not interested, providing you can get a market for that

bill. But if you want to sell to some house that you are not very well acquainted with, be it in South America or in Europe, what you are going to require of that man is a reimbursement. He must go to some bank and arrange for that credit, and you in turn must accept that bank providing the bank is satisfactory to you. But even in an instance like that you still, as the maker of the draft, remain the sponsor of the credit. You are responsible for your faith in that purchaser, and that is the custom the world over.

COMES BACK TO HOME PRACTICE

But of course the liability that you are assuming is very remote. That is the very reason that a prime bank's bill commands such a fine discount over a bill on a firm in England or Germany. No matter how well that firm stands, the bank's credit is regarded as better, and given firms are credited according to the risk involved. And that is exactly the arrangement that you have got to make in all your transactions in South America or in any other foreign country; and that is why so much stress has been laid upon the subject of domestic acceptances, because our country is so vast that its business could not be handled except upon some basis that permits you to sell to a house in Washington that you never heard of by drawing a bill against a bank there, if the bank will furnish the credit. That is the way it has to be done.

Now there are undoubtedly houses in Buenos Aires, Sao Paulo or Rio de Janeiro that the National City Bank of New York will be perfectly willing to purchase bills on. Where you are not satisfied with the credit, certainly you have only one thing to do: If they want your goods let them pay for them, or arrange down there through their own bank. They can, if need be, make a deposit there and cable to you that such an arrangement has been made. There is no difference in methods of doing business with houses in South America in that respect and elsewhere, except that there is a certain amount of inconvenience in getting the necessary information on which to base your credits. We are endeavoring to get up our credit files, as we want to know something about the character of the bills that we have to buy. We are perfectly willing to purchase bills on the more responsible houses in South America as well as on the more responsible banks. For instance, if you want to make a shipment of machine tools to a house in Buenos Aires and they give you a credit against a well-known bank there we would buy it as readily as one against you or against any of the other banks there whose standing we are familiar with as first class. We would be perfectly willing to buy those bills if your customer finds it more convenient to give them to you.

Mr. Reck: The manufacturer here, then, will be just as able to rely on the credits recommended by the National City Bank of New York in those various centers as he would be on the recommendations of any of the banks in this country on whom he is accustomed to rely?

BUILDING UP CREDIT FILES

Mr. Eldridge: Exactly. Wherever you sell a bill of goods to a party that you don't know thoroughly or it involves a large amount, you are very careful to revise your credit information data. It is the intention of the National City Bank of New York City to build up its credit files so that they will be as nearly accurate for that region as it is possible to make them, and we shall endeavor to give not only every customer but any American merchant inquir-

ing the benefit of them. We do not insist that you do business with us to get this information. All you have to do is to ask us for it; we are willing to give it to you. We shall endeavor to be prepared to give as close information as is possible to obtain; but in a country where Dun and Bradstreet have found that only 18 per cent. of the merchants are willing to give a financial statement you can imagine what a difficult problem it is going to be. We have to rely a great deal upon reputation, but are going to get as good experts as we possibly can and dig down deep as we possibly can without having them throw us out of doors. We want to secure such information as will render it fairly safe to do business, and we propose to back up our faith; that is, where we honestly believe the merchant is first class and will pay his bills we will accept bills for them.

Mr. Reck: Mr. Eldridge, every member of this association is heartily in accord with your action. The establishment of workable bases of credit is one of the necessary moves that must be made; it is pioneer work which together with means of transportation must precede any successful effort to get that trade.

LITTLE PROFIT IN PIONEERING

Mr. Eldridge: I may say to you in passing that the National City Bank is not expecting to make very much money out of this proposition for a good many years to come. On the contrary, we look forward to giving up rather liberally in the way of our preliminary expense. We further realize that as soon as we blaze the way, if the thing is a big success, doubtless a great many other banks in this country will find it to their interest to establish branches there, and we will heartily welcome them, because the bigger the field the better for our country and for all of us.

One of the great advantages of a foreign trade is readily understood when you take into consideration that every dollar of merchandise that leaves your shores for a foreign country gives you a call upon that country for one dollar of gold, and that gold is the standard of value and the basis of all credit. The more we can protect the gold reserve of this country, the more do we protect our merchants, our industries, and the cheapness with which credit may be obtained. Active foreign trade is one of the most desirable things that any country can possess because it creates a tremendous call upon the gold of the world and forces the other countries who are our buyers to either give of their products in return or of their gold.

WEALTH FROM FOREIGN TRADE

Naturally any country that can develop a great foreign trade will develop a good import trade in the products of the country to whom our exports go. That country must in turn ship to us its products in order to reduce the balance of trade against it. The reason that London was able to hold its tremendous position in the business world lies in the fact that it is the clearing house of the world where all international credits are settled. A draft on London is always given preference over a draft on Paris or on Berlin, because everybody can use it. On exactly the same principle a merchant down in, let us say, Memphis, Tenn., finds that he cannot use St. Louis exchange as conveniently as he can New York exchange, because he has a greater call for New York exchange.

That is the reason that London retains its tight grip upon all the countries of the world. It is this which enables London on a little old 250 million dol-

lars of gold in normal times actually to control the commerce of the world. It finances the commerce of the world on a stock of gold not one-sixth of what we have in this country; and the reason that we in this country are not taking advantage of the great gold stock we have which is double that of any nation in the world, is because we have never had the good sense to provide for its mobilization.

We do not need gold certificates to circulate among our people. What man feels safer because he has a gold certificate in his pocket than if he had a national bank note? One is just as good as the other. Through our federal reserve act we have taken a long step forward toward perfecting our financial system and improving financial conditions. You are going to see in the course of the next five years a great change in the way of doing business. We are gradually approaching scientific methods. We have been blundering in the dark in the past.

THE OUTLOOK FOR BETTER BUSINESS

I think we can all look forward to better business conditions when this great war is settled. We are going to be a long time recovering from the effects of the war. Our foreign trade is temporarily going to be larger than it has been in the past. The nations that are at war will be compelled to buy from us, because we are the only great nation capable of supplying them foodstuffs and articles of war that they must have. Logically as long as the war continues so long must we continue to make large exports because they have got to have what we can sell them. That is going to help us, it is going to permit us in a way to protect ourselves, by the credits that must necessarily be established to purchase those things, against the load of securities that they may dump upon us.

Personally I do not think that they are going to dump those securities upon us in the amounts that some have anticipated, for the simple reason that a man is going to want to sell as a general thing that which he thinks the least of, and keep that which he most values. American securities to-day of a standard kind are the best available securities in the world, because this nation is at peace and there is no reason why our securities should not continue paying dividends as they fall due. Therefore they are reliable, and the man who is not used to work, the man who is living on an income and could not make a living in any other way than clipping coupons is going to give that very great consideration. Therefore, I think that when this war is over, if it lasts one or two years, as a great many think it will, we will be in pretty good shape. But let us not delude ourselves with the idea that we are about to enter upon a great era of prosperity; because capital cannot be impaired, permanent improvements cannot be destroyed, human life cannot be destroyed as it is being destroyed in Europe to-day, without affecting the whole world. We are bound to feel the results, but we will feel them less than any great nation in the world.

When this great struggle is over and the balance of trade is struck on the books, you are going to find that your Uncle Samuel stands mighty well through having kept out of war, and will be able to show a better trial balance sheet than any nation on earth, and be able to go ahead and do business better than any of them. Then will come the time when we will realize the great value of mobilizing our gold reserve. We will by that time have still further added to it, because it will be hard to take it away from us when once we get on our feet, and then is the time when we can talk about financing other countries.

C. Wood Walter, Cincinnati Milling Machine Company, Cincinnati: You have described the function of those American banks as regards credit. Does the German, or the English bank do any more than just that for the trade of those countries down there?

THE REASON FOR LONG CREDITS

Mr. Eldridge: They finance bills, and they have been, as I understand it, quite liberal in their financing. That is, they would accept for various houses there—assume the credit responsibility themselves to a considerable extent where it was a very desirable customer. You understand that England and Germany have been right at one another's throats for business. Deep down in their hearts that is what has been the matter between England and Germany for a good while. England, for instance, had the South American trade pretty well in hand when Germany stepped in; England was selling its goods practically upon a 60-day basis. Germany came and finding it hard to get the business, and realizing that most people are very much tempted by being able to get good credit, said to them: "England makes you pay in 60 days; we are not hogs like them, we will make it 90" (laughter); and immediately a great deal of the English trade began drifting to the Germans. England comes up to the scratch and says: "Germany is not as lenient as you think she is; we will make it four months." And so it went on until they got it up to six months for goods that had always before been sold on 60 days' time.

That was a very nice thing for the Argentine merchants, at least they thought so. As a matter of fact it was one of the worst things that could have happened in any country, because when you sell goods on terms longer than you should and the purchaser realizes on them and gets the money in his jeans it always burns him. He cannot resist the feeling that here is an excellent opportunity to buy a piece of property or make some less safe investment in a booming country where land values fluctuate rapidly; and by the time the account really falls due his money is tied up or he has failed to make a profit on the investment. He may have gone into a losing speculation. I think that situation has developed disadvantageously in South American countries, especially Argentina.

CREDITS SHOULD BE SHORTENED

If, therefore, trade is pushed with Argentina it should be established on a solid business basis. Any of you can see the justice of that for yourselves and will recognize the truth of these observations. If a man does not have to pay anything for a good while he begins to think he may never have to pay it. I know, as a banker, that I have met a great many people who never think of paying even when you suggest it to them. I have known merchants that go along year after year and never pay up. As long as they keep themselves in a solvent condition you are perfectly willing to loan them money; it is a safe risk. But you let a fellow get the idea that he can get credit as much as he wants and that he can extend whenever he wants to, and there is no need of ever paying up on time, that man is in a precarious condition. His business is not being run in good shape and his head may go under at any time that a stringency develops in the money market. But the man that keeps his business in good shape, and has always ready assets sufficient to pay his bills as they fall due, is a far more desirable customer. He is a good risk and can always get money no matter what sort of financial weather prevails.

MANAGEMENT SOCIETY MEETING

Philadelphia Gathering Addressed by F. W. Taylor—Paper on Managing Salesmen

A meeting devoted to scientific management was held in Philadelphia, Saturday, October 24. It listened to an illuminating and personal, if indeed not confidential, address by Frederick W. Taylor and was given an exposition of the beginnings of scientific management as applied to the selling force. The meeting was one of the regular gatherings of an association the name of which describes its object: the Society to Promote the Science of Management. The organization was established a few years ago and its membership, which is not large as scientific societies go, is composed largely of mechanical engineers, as is natural in view of the fact that scientific management had its start in metal working or those industrial establishments which are sometimes known as engineering works. With the expansion of the new idea in management varied industries have been reached and among the participants in the meeting were others than engineers.

The meeting was held at the Engineers' Club, Spruce street, Philadelphia. Mr. Taylor's address was given in the early afternoon, followed by informal discussions which partook of the nature of round-table talks; a paper was presented in the evening by H. W. Brown, of the Tabor Mfg. Company, maker of molding machines, on "The Application of Scientific Management to Selling," and between times what might be termed square-table talks were indulged in, as arrangements had been made for both luncheon and dinner in the club building with all in the way of pleasure, profit and sociability which such provision rendered possible.

Mr. Taylor spoke in an intimate way, relating, in part, his conversations with labor leaders and labor workers in connection with Federal legislation respecting scientific management in Government workshops, but also dwelt on the possibility of an approach toward establishing a wage basis calculated to bring about an equalization of compensation for equal efforts among different industries. He touched on such questions as restriction of output and collective bargaining and made it clear how difficult and slow it is to convince even those high in labor circles of the true economics of large individual output. Owing to its somewhat confidential character some other sidelights thrown on the general subject will, for the present, have to go without explanation, but it is hoped later to present the leading features of the address.

SCIENTIFIC MANAGEMENT IN COLLEGES

The informal or round-table discussions included the question of the extension of scientific management through teaching in the colleges. Prof. H. W. Shelton, of the Amos Tuck School of Administration and Finance, Dartmouth College, told how the students are given investigations which they are expected to complete. Owing to the difficulty of working in factories in a center like Hanover, N. H., the students are given relatively simple problems, such as window washing, floor cleaning, bed making and the like, but must be so thorough in their investigations regarding how such operations may be improved that the last word is said on each problem when the work is completed. H. K. Hathaway, vice-president Tabor Mfg. Company, Philadelphia, complimented the plan, because it is substantially impossible to teach scientific management in the abstract. He feels that college graduates, to get into the movement, must spend one to three years, say, at low wages, at the bottom scales of work in a factory. Dr. William Kent and Prof. C. B. Thompson, Harvard University, made observations regarding the same necessity.

A USE FOR THE TABULATING MACHINE

Another topic covered had to do with new developments in the application of scientific management. Robert T. Kent described some time-saving devices in use at the Plimpton press, Norwood, Mass., and H. W. Reed, Day & Zimmermann, Philadelphia, described an

interesting use of the Hollerith tabulating machine. The Hollerith tabulating cards were designed with letters as well as figures, so that symbols involving letters could be used and each card was made the original time card, for example, of a workman, indicating on it the time of starting and ending work, the rate of pay, the work on which the time had been spent and the symbol. Perforating the cards in accordance with all these classifications, they could quickly be run through the machine to obtain payrolls and an indefinite number of other combinations, as regards the cost of given detail of work. Without attempting to detail what is actually done with the cards, it may be stated that Mr. Reed finds the cost one-fifth to one-sixth of what it was when the same work was done by hand; that it gives desired analyses in an hour's time against one day otherwise and finally that information is obtained from sorting that would not otherwise have been obtained because of the time required, not to say questionable accuracy. It was pointed out that for \$1500 additional expense much information was obtained against indifferent figures of no value as was the case before. With the system reports are possible within two days after the collection of records.

On the subject of new developments, a device known as the Index Visible, made at New Haven, Conn., as used by the Acme Wire Company at New Haven, was shown, adapted for use as a control board. A number of removable vertical light metal members are mounted on a stand. Each of these metal members is arranged to receive small cards, so made as to fit upon the metal at any point. Each metal strip may correspond to some function of manufacture, the first, for example, being time study. The cards are arranged in the order of work under each function, and as the work progresses from department to department, the card is readily removed from the one metal member to the next.

MANAGEMENT OF SALESMEN

Mr. Brown's paper of the evening session told how the territory of the salesmen, for one thing, was studied, indicating that in some cases it would be a physical impossibility for a salesman properly to cover his territory; that as a matter of fact large numbers of possible buyers had never been visited, and that in some cases a redistribution was necessary with the engagement of more men, properly to take care of all prospects. The result is now that instead of the salesman's having to lay out his trip, the home office sends him a batch of cards, containing essential information which had finally been collected, such as the name of the person to see in a given plant, the kind of machinery already installed and other particulars, so that the salesman is able before making a visit to understand the conditions of particular plants, even when he may not have been there himself previously. This batch of cards is arranged to give the salesman an opportunity to cover the territory for the covered period within a time which is reasonable. When it is noted that he is reaching the end of this particular tour, which tour, of course, is also carefully arranged not only as to railroad routes but also as to train connections, a second batch is sent to him. Each of the cards has a place for a salesman's notation, sometimes merely a few words sufficing, and instead of his being required to make a report along his own lines, he needs merely to fill in the blanks called for on the card, when it is mailed and the home office kept in touch with his work. From the same cards is obtained information as to where the salesman may be reached by telegraph, parcel post or any other way.

The system is flexible, so that in case of an emergency inquiry, the salesman may drop his route and proceed on telegraphic instruction to the point of inquiry, receiving shortly after he reaches there a new routing, which has been in the meantime laid out in the home office, so that he may work then with minimum expense of time and money from the new point. He has meanwhile returned the uncovered portion of the route on which he was working, and this will again be brought up at a proper time. Given factories are again placed into a route largely on the basis of the

former report which the salesman makes. He may, for example, indicate that the prospect is a likely buyer at some definite future date, and at the home office this fact is noted, and a tickler provides for bringing up this notation at the proper time. In the home office these cards and coupons from them are used after the fashion that work tickets are employed under scientific management for covering the work in progress and the work yet to be done, so that the home selling department becomes a planning office, arranging tasks in advance of the job at present being performed by the salesman. Mr. Brown considered that the system is still in the making or in evolution, but so far has found it eminently satisfactory. The system has even a parallel to scientific management as commonly practiced in that an attempt has been made to provide a bonus. Much store is not set on this as an additional compensation for effort, but instead for the comparative showing that it makes among the salesmen. The bonus has taken the shape of a special gold medal and is awarded on a marking system which takes into account a number of factors, such as the number of calls made per day, the closeness with which the calls are kept to schedule, the amount of business written and the like.

Besides those already mentioned, the following were among the participants:

Dr. H. S. Person, director Amos Tuck School of Administration and Finance, Dartmouth College, and president of the society.

Robert T. Kent, secretary of the society, 116 West Thirty-second street, New York City.

James M. Dodge, president Link-Belt Company.

Wilfred Lewis, president Tabor Mfg. Company.

Oberlin Smith, president Ferracute Machine Company, Bridgeton, N. J.

Carl G. Barth, Philadelphia.

Charles Day and Conrad Lauer, of Day & Zimmermann, Philadelphia.

Morris L. Cooke, director of public works, Philadelphia.

William J. Adam, K. W. Freund and L. von Hasslacher, of the Robert Gair Company, Brooklyn.

Dwight V. Merrick, New York.

Clark Freeman, Remington Typewriter Company, Ilion, N. Y.

A total of \$396,354.73 was disbursed by employers to workmen or their dependents for industrial accidents in Wisconsin under the workmen's compensation act during the first 28 months of its operation, ending January 1, 1914. The industrial commission has just issued a report covering the period. The sum represents the amount paid in 6894 cases but does not include medical expense, which averages 50 per cent. of the amount paid as compensation. The total therefore is approximately \$600,000, all of which was paid by employers direct or through insurance companies. Of the total of 6894 cases, only 156 involved differences of opinion or disputes that demanded formal decision by the commission. All of the others were settled amicably between employees and employers and no attorneys were needed.

The Illinois Steel Company has already placed in effect at its South works the campaign against intoxicating liquors suggested at the Chicago meeting of the National Council for Industrial Safety. One form in which the company is bringing its influence to bear upon the men is in the display of the following signs: "Did Booze Ever Do You Any Good?" "Did Booze Ever Help You Get a Better Job?" "Did Booze Ever Contribute Anything to the Happiness of Your Family?"

The New Haven Manufacturers' Exhibit, New Haven, Conn., will be held December 3, 4 and 5 in the Auditorium Building, which is its permanent home. The floor area is about 7000 sq. ft., and the booths in which New Haven products will be displayed range in size from 8 x 3 ft. to 13 x 13 ft. Many of the booths will be devoted to working demonstrations.

CORRESPONDENCE

For One Universal Danger Sign

To the Editor: The writer of the editorial in *The Iron Age* of October 22, entitled "Safety First" May Defeat its Purpose" gives less than due regard to the experience which has so urgently suggested one universal danger sign. For many months an important direction in which those most prominent in the safety movement have worked is the devising of one particular sign which will be universally symbolic of danger. So excellent an authority as M. W. Alexander has stated that even the printing of danger signs in the various foreign languages so that they may be most easily understood by the workmen of different nationalities is no longer considered necessary or the best plan. Those who have given greatest study to the problem lean toward the selection of some one word, design and color which will automatically convey its meaning.

It has been found that the English word "danger," which to English-speaking people conveys its particular dictionary meaning, also carries to the foreigner who understands no English, exactly the same significance because he has learned from constantly seeing the form of the word that it is used only to indicate such places as involve peril to him. A red light shown at any time on any highway, whether for foot passengers, train service or any kind of traffic, is instantly understood to mean danger. The consciousness of its significance is instinctive and reflexively a precautionary attitude is induced in the individual. How could the substitution of lights of various colors enhance the protective value of the warning? The goal sought in the matter of danger signs is that type of sign which will automatically and instantly put a man on his guard, without requiring a deliberate conscious act of reading and interpreting a warning.

The editorial in question seems to be a "right about face" from the very earnest and well-supported effort that has been made to fix upon one universally accepted danger sign.

SAFETY.

Tracing Shipments

To the Editor: These are the days, the public being so convinced that high prices are caused by waste and inefficiency, that we must all help each other out in order to conduct our business as economically as possible.

I have long observed when any of our customers request us to trace a missing shipment the final report coming from the carrier, in proving delivery, shows, in a large percentage of cases, that the goods was received by the consignee two or three days after their request for the tracer.

Now, most of us realize that freight is often transferred from one railroad to another and also that thousands of the shipments made every day are less carload. To trace these shipments means a great deal of correspondence between the offices of the transportation companies and the maintaining of a considerable clerical force to ferret out the shipments and report on them to the shippers every time they ask for information. The writer has now before him the documents in one case where the road was still engaged in tracing a small shipment over a month after the consignee had received it.

It would seem the logical thing for the customer to have notified us when the shipment arrived, thus enabling us in turn to inform the railroad. If all consignees adopted this practice, and the shipper could notify an agent to spend no more time tracing any certain shipment, not only could the carrier perform the work with a smaller clerical force, but also more promptly locate goods still undelivered. Perhaps it is necessary to add that this suggestion comes not from a railroad man, but from a shipper.

While not exactly germane to the above, I am reminded of an instance in which an express company

proved delivery of a shipment and some days later sent to the shipper a remittance covering the value stated on the receipt. You might say that the managers felt so badly over the delay that they could not do enough for us. But who ever heard of an express company feeling that way?

H. D. MURPHY.

Jersey City, N. J.

Why Give Away "Good Will"?

To the Editor: Export business is now being sought by manufacturers throughout the United States, and the question of methods challenges the attention of all. Granted that the American manufacturer of any product possesses such advantages of better situation, cheaper material, more ingenious machinery, or, most of all, superior factory organization as enable him to compete in the markets of the world, his first inquiry is how to go about it.

It is obvious that the best method at any given point is for him to go after the business himself, provided the demand is sufficient and the right man is available. By the "right man," I do not necessarily mean the man who knows the product best but the man whose ability, tact, experience in meeting men of different nationalities and knowledge of commercial conditions mark him as most likely to achieve success in the field chosen.

In such a center as London, for instance, where the volume of inquiries and orders received from all over the world for the products of Europe and America is far greater than in any other city, it is clear that, always granting a sufficient potential demand, a manufacturer ought to have a representative able adequately to put his claims for a share in the world's business. In how few cases, however, does he have this representation in his own name! If he employs the services of a commission house to represent him, how often does he go himself to the ground, or send some one, to see that his goods are satisfactory to the consumers, are understood by his agent, and are being intelligently and energetically pushed?

If, on the other hand, he gives an agency to some dealer, does he realize that the business is being built up, not in his own name but in the name of the house which handles the goods, which may and very likely will, at the first opportunity, transfer the larger portion of the good will which his product has earned to some other manufacturer of slightly cheaper or somewhat similar goods? Does he grasp the fact that the dealer who gives a stock order to secure a sole agency almost always does it to shut out all his competitors, who, in the case of a really meritorious article properly introduced by the manufacturer himself, would probably be customers? No goods are really sold until they are paid for by the ultimate consumer, and the inexperienced manufacturer who is blinded by the "stock order" is like the little fish which takes the bait without seeing the hook.

Far be it from me to deprecate the splendid services of dealers, who honestly push a manufacturer's product. My point is that no principal can expect his goods to be pushed properly unless he sees to it himself and sees that they are pushed in his own name. Just here let me indicate the worst example of the manufacturer who is blind to his own best interests. Too lazy or "too busy" to take a broad survey of the conditions and to plan an export campaign, he hastily grasps the first opportunity to get a stock order, too ignorant of conditions to give time for development of an agency, he thinks it "good business" to take away his agency from the firm which has been honestly pushing the line and to give it to the concern which always stands ready to take advantage of development work done by another. Too greedy of immediate profits to foster the steady stream of export business, he starves out his foreign customers when a home demand comes on, only to go back, cap in hand, to solicit a business which will never come to him again. Least of all does he go abroad himself or send his trusted man to the field where he is trying to sell, although he would not dream of handling his business at home without seeing his customers regularly. For such a man this letter is not written.

But how is the manufacturer to sell abroad in his own name if he has not sufficient present nor prospective volume of business to carry the considerable expense of an office and staff entirely his own? The answer to this is that, in every large city abroad, individuals or firms can be found willing and able to represent manufacturers adequately and suitably if they are paid even a moderate proportion of what a manufacturer's own office would cost.

The manufacturer's own name should be on the door, in such cases, without any such words as "agents for" before it; it should equally be made prominent in the telephone book and the local directory; his own letter paper should be used, and the word "agent" should be abolished. Supplemented here and there by prudent advertising, a plan such as this enables the small manufacturer to hold his own with the larger and gives him a foothold and a place of business when he goes abroad for his annual tour of assistance, education and encouragement. Nor should he forget that his representative is in this case his paid employee as regards a certain portion of his time, and, like other employees, should periodically be brought home to the factory to keep in close touch with the business.

To sum up the ideal is in each case that the manufacturer should have his own office in the world's great centers; if he cannot have his own place at each, he should at least be represented in his own name, be it by co-operative representation, dealer or commission house, but, whichever method he adopts, he should treat his export business with the same seriousness as his domestic trade, should plan for a campaign rather than for incidental business and most of all, with diligence, energy and patience, see to it himself.

R. N. FAIRBANKS.

[Mr. Fairbanks, who is temporarily at 30 Church street, New York, has made his home in London for several years. He has traveled in Europe, the British Colonies, Spanish America and the Far East in the interests of export trade.]

Programme of National Founders' Meeting

The National Founders' Association will hold its annual meeting at the Hotel Astor, New York City, on November 18 and 19. The council will meet on the morning of November 17 and there will be the usual so-called alumni dinner on the evening of November 17, at which former President O. P. Briggs will preside.

The session of Wednesday morning, November 18, will take up the reports of officers, including one from Marshall Cushing, Washington correspondent, on "The Political and Social Significance of Recent Labor Legislation." A buffet luncheon will be served immediately following adjournment.

For the Wednesday afternoon session are announced the following addresses:

Constitutional Changes and Industrial Progress, by George F. Monaghan, general attorney for National Founders' Association.

The Federal Commission on Industrial Relations, by Walter Drew, commissioner National Erectors Association.

Foundry Hazards and How to Guard Against Them (the report of the committee on safety and sanitation), by Magnus W. Alexander, chairman.

On Wednesday evening, November 18, there will be a subscription banquet, at which Mr. Monaghan will be toastmaster. Maj. Edward J. Boughton, Judge Advocate Military, District of Colorado, will speak on "The Coal Strike and Rebellion in Colorado." One other speaker is expected, to be announced later.

For the last session, Thursday morning, the following addresses are scheduled, together with committee reports and the election of officers:

New York State Workmen's Compensation Law, by C. A. Chase, Syracuse.

How Does the Recent Federal Legislation Affect Labor Combinations, by James A. Emery, counsel, National Council for Industrial Defence?

Waste in Hiring and Discharging Men*

Over 18 Times the Numbers Needed
Sometimes Engaged to Increase a Force
—Each New Employee Costs \$35

BY MAGNUS W. ALEXANDER†

If you take a factory with 1000 employees at the beginning of the year, and increase its permanent force to 1100 at the end of the year, then theoretically under ideal conditions only 100 people should have been hired; but conditions are not ideal, and as business men we cannot expect theoretical conditions to surround our business, so immediately we must make allowance for certain items, viz.:

1.—Men die, and they must be replaced.

2.—Men fall sick, and are laid off for a longer or shorter period of time, at the end of which time, failing to return, they are discharged, and their places filled by others.

3.—Men might be hired under proper conditions, with the proper judgment exercised in their selection, yet of their own accord they may not find it possible to remain in their positions, whether because of climatic conditions, domestic affairs, or other causes which necessitate their removing from the locality.

4.—We must make a certain allowance for less than 100 per cent. of efficiency in the hiring department.

I believe that it must be assumed that only about 1 per cent. of the force of employees die; that about 5 per cent. leave the employ on account of sickness of more than two weeks' duration; that about 10 per cent. withdraw from the service or are eliminated from the service for whatsoever reason; and finally, I have assumed only 75 per cent. of efficiency for the hiring department, because it is a specialized department in the hands of one or a few which can be more easily brought to a higher degree of efficiency than a large department or one that has to be in the keeping of a great many.

As to the 1 per cent. allowance for those to die, I have had recourse to insurance statistics and actuarial figures. Insurance statistics also show that less than 10 per cent. of the average factory employees are sick annually for more than two weeks. I have assumed only a 5 per cent. rate because I know that usually, with respect to employees of some length of service, it is customary in factories to keep them on the pay-roll, even though without giving them any wage for a considerably longer period than two weeks. No reliable experience is available to show how many people withdraw during the year from whatsoever reason, or are asked to withdraw; in fact, the only information that I could find is contained in the United States civil service reports, wherein it is stated that 8 per cent. of all employees in the government civil service are separated from the service annually, for reasons, including sickness and discharge; or, excluding sickness, the figure is somewhere around 4 or 5 per cent. I realize that the governmental conditions are different from conditions in industrial establishments; I have, therefore, doubled the figure, and have taken 10 per cent. as the withdrawals by discharge, whether voluntary or involuntary.

Thus it is shown that you have to add 16 per cent., or 160 men to the 1000 in the factory at the beginning of the year in order to show an increase of 100 at the end of the year. Then, again, taking into consideration that the efficiency of your hiring department is 75 per cent., that would furthermore increase the number of those taken on by about 40; yet the facts show that about 635 were actually engaged. So there appears to be no valid reason why 635 people were brought into this factory as strangers to the plant and had to be broken into the ways of the plant in order to increase the force permanently by only 100. It is

obvious that a considerable expenditure of money, effort and care must have been wasted in this respect.

TO INCREASE 42,000 TO 48,697, 42,571 WERE HIRED

I took a certain group of factories and endeavored to arrive at a financial valuation, for that purpose dividing the employees into different classes. I placed

In class *a* all highly skilled mechanics who have practiced their trade for a number of years, having acquired it through apprenticeship with more or less regularity.

Under class *b* I included mechanics of lesser skill and experience who very likely could within one year acquire an average degree of efficiency.

In class *c* were included operatives who without any skill or experience soon acquired a sufficient degree of practical knowledge to do the work; such as piece workers whose time on probation is understood to be anywhere from 1 to 3 months.

Class *d* takes in all unskilled productive laborers who can be let go to-day and replaced by others tomorrow without great loss in the efficiency of the work.

In class *e* I put clerks, shop officers, shop room and labor department and cost accounting officers. The managers of the various factories were good enough to furnish me this information; and I classified the whole number, which covered more than 42,000, in that way.

I found that the increase between January 1 and December 31 had been 6697, and that the total number who had been engaged for that purpose was 42,571. Applying the percentages which I mentioned before, and also the 75 per cent. efficiency of the hiring department, I found that only 17,596 should have been engaged; but even further allowing in the neighborhood of 3000 discharges or additional men hired merely due to conditions of production over which no one could have any control, I have by hook or crook brought the figure up to 20,350, which shows that in order to hire 6697 people they took on in these plants 42,570, although the hiring of at least 22,220 could have been avoided if proper methods and means had been applied.

I think that the economic loss involved in the hiring and discharge of employees may be grouped under the following five heads:

1.—The clerical work of hiring.

2.—The instruction of new employees by the foremen and assistants.

3.—Increased wear and tear of and damage to machinery and tools by new men.

4.—Decreased rate of production during the early period of productivity of the new men.

5.—Increased amount of spoiled work by new employees.

Now let us take these five items and analyse them as to financial value.

THE CLERICAL WORK IN HIRING LABOR

This no doubt is the smallest item, but still requires a certain amount of work in the hiring department. It includes interviewing the applicant, who may apply at the plant or department; also the cost of sending the hiring clerk into the field to find people, incurring thereby the expense of traveling and often in addition expense of advertising. When interviewed and engaged the name of the employee is put on the pay-roll book. Various papers have to be made out when he leaves to make room for somebody else who of necessity has to be put in his place, and the whole process has to be gone over again. In addition, the man who leaves has

*From an address made before the National Machine Tool Builders' Association, New York, October 22.

†General Electric Company, Lynn, Mass.

to be taken off the pay-roll book, etc., and I think I am conservative in placing this item at 50 cents per employee.

INSTRUCTION EXPENSE

This is very largely in amount dependent upon the nature of the work and the skill and experience of the new employee. If you will bear in mind the classification of employees, this instruction expense will naturally be lowest in class *d*, the unskilled productive laborer, where the expense will be \$1 or \$2 each. It may be said that perhaps \$7.50 per employee will apply to class *a*, highly skilled mechanics who have had many years of experience behind them, and it surely will double, or amount to \$15, per employee for class *b*; and for *c*, including mechanics of lesser skill, such as piece workers; the less skilled they are the less they have capacity for, and you must therefore expend correspondingly more labor or cost in instructing them in the particular work for which you require them. We will put this cost at \$20. For class *e*, which includes clerks in the cost accounting department, stock room, office and the like, it may surprise some of you gentlemen, but it is nevertheless true that the cost of instruction will be as high as for class *a*.

VALUE OF WEAR AND TEAR

The value of the increased wear and tear and damage to machinery and tools is very difficult to estimate. It will be very small for the clerks in class *e*, and for the unskilled labor in class *d*, and relatively small also for the highly skilled mechanics, but class *b*, mechanics of lesser skill, and particularly class *c*, piece workers, contribute very largely to the expense account of the factory in wear and tear of machinery and tools. To assign a value, I have taken \$1 for the first class mentioned and only \$10 for the last class mentioned.

THE LOSS DUE TO REDUCED PRODUCTION

of course is entirely dependent on the value of the produced article, its particular nature and the experience and skill required for its production. My guess, based on some investigation is, that unproductive labor may entail a loss in this direction of \$5 per new employee and the class of clerks in the various departments may entail a loss of \$10 per new employee. The highly skilled men may have a reduced productivity throughout the first few weeks amounting to about \$20 per employee; and the large class of piece workers may cost a loss of somewhere in the neighborhood of about \$20 each, which for their generally less wage means a higher percentage of reduced productivity during the whole period.

EXPENSE FROM SPOILED MATERIAL

The expense due to the increased amount of spoiled work again depends entirely upon the value of the material and the work of the department. I cannot be very far amiss if I assign generally a value of \$5 to the last three classes and a value of \$15 to the first two classes.

On this basis then I find that the expense for clerical labor is 50 cents throughout; the expense for instruction taking classes *a*, *b*, *c*, *d* and *e* at \$7.50, \$15, \$20, \$2 and \$7.50, respectively; for wear and tear, at \$10 in classes *b* and *c*, respectively, and \$1 in classes *a*, *d* and *e*, respectively; for loss of production at \$15 in class *a*, \$20 in classes *b* and *c*, respectively, and \$5 in classes *d* and *e*, respectively; and for spoiled material at \$5 in class *a*, the highly skilled class, at \$15 in classes *b* and *c*, respectively, and nothing for unproductive labor and clerks. This gives me a total of about \$37 loss per highly skilled mechanic in new employment; about \$60 loss for mechanics of lesser skill, and about \$65 for the average piece worker, \$8.50 for the unproductive laborer, and \$20 for the clerk.

THE CASE OF A \$750,000 LOSS

Before carrying out the multiplication, in order to be as fair as possible, I have reduced the figures in all these classes to about one-quarter to one-half the values above given, and in multiplying now the number of

people in each grade by the financial value here assigned I have the astonishing result that the 22,220 employees, who after making all kinds of allowances were unnecessarily engaged, meant an average loss through their engagement of somewhat over \$35 per man to this group of factories, or an actual loss of \$750,000 in one year, all of which could have been eliminated, and which amount represents a very considerable percentage of the profits of the various concerns.

WHAT TO DO TO REDUCE THE LOSS

Assuming that these figures are fairly correct, we are immediately faced with this question: How can this loss of three-quarters of a million dollars be avoided, if not entirely, at least in part? To this question I think five answers present themselves:

First: A careful study of current employment statistics should be made and an analysis of the reasons for the discharges.

Secondly, we need a far higher grade of men in charge of the hiring and firing of men than we have had heretofore in our employment clerks.

Third: While it is important to exercise proper care, thought and study in the hiring of employees, it seems vastly more important to apply the proper methods in initiating new employees in the work, and to treat them properly.

Fourth: We ought to have effective systems of apprenticeship, factory schools, special training courses, or whatever name you may call them, so that we may not be dependent only on the grown up men as they float around the country, but that we may effectively take hold of the youth of the country and train them in the ways of our industry, and in loyalty and intelligence.

Finally, so far as it can be done, we ought to be able to regulate a little more the commercial requirements as they come to the factory.

CONDITIONS IN ENGLAND AND GERMANY

This man problem strikes at a very vital feature of our business, not only because competition at home is growing keener and keener, but because our competition from foreign markets will be found to be just as keen or even keener than in the past. It may, therefore, be reassuring to tell you that the problem seems to be of a somewhat international character. Let me give you a few illustrations drawn from factory experience in Germany and England in respect to this question:

A factory which had 13,556 employees at the beginning of the year and 16,450 at the end of the year, or an increase of 2894, or 21 1/4 per cent., engaged 9530 people in order to secure 2894, or in other words, 3 times as many; a fairly good condition.

Another factory started with 9165, and increased in the year to 12,032, an increase of 2867, representing 31 1/4 per cent., to accomplish which it engaged 10,982 people, or we will say about 3 1/2 times the increase in the force.

Coming down to a smaller factory still, at the beginning of the year they had 4636 people, at the end of the year 5270, an increase of 634, or 13.75 per cent. This required the engaging of 4845 employees, or 7 1/2 times the increase in the force at the end of the year.

A factory which increased from 365 employees at the beginning of the year to 470 at the end of the year, an increase of 105, or nearly 29 per cent., engaged 637 to gain the increase of 105, or a little over six times the final increase in the force.

A large German factory at the beginning of the year had 10,998 employees; at the end of the year, 11,914, an increase of 916, or say 8.5 per cent.; and it engaged 17,059 employees, or 18 1/2 times the increase: a figure so astonishing for a concern priding itself upon its fine organization that I got permission from the president of the company to go over the books myself and checked it to the very last figure, finding the above correct.

An English factory which stands high among English manufacturing concerns, at the beginning of the year had 3158 people employed, at the end of the year they had 3149, or nine less than they started with; yet 2148 people were required to be taken on to obtain this minus result. I have not yet had time to figure out what percentage that was.

Trade with Russia Should Be Developed

Data Laid Before the American Manufacturers' Export Association—President Farrell on Aspects of the Export Problem

The fifth annual convention of the American Manufacturers' Export Association, which has headquarters at 66 Broadway, New York, was held at the Hotel Biltmore, Thursday, October 22. The president, Charles E. Jennings, of C. E. Jennings & Co., in his annual address distinguished between the American Manufacturers' Export Association and other national associations in that the former directs its efforts solely to the fostering of foreign trade, its members being all engaged in foreign commerce. The report of the secretary, E. V. Douglass, showed a convention attendance of 210 members as against 136 one year ago. The total membership throughout the United States is now 408, having nearly doubled in the year.

The officers chosen for the coming year are the following: President, Alba B. Johnson, president Baldwin Locomotive Works, Philadelphia; first vice-president, Chas. A. Schieren, Jr., president of Charles A. Schieren Company, New York; second vice-president, A. N. Hargrove, J. G. Brill Company, Philadelphia; third vice-president, W. F. Adam, Clarence Whitman & Co., New York; treasurer, E. H. Huxley, manager of the foreign department of the United States Rubber Company, New York. New directors for a three years term are James A. Farrell, president United States Steel Corporation, and M. A. Oudin, manager of the foreign department of the General Electric Company, Schenectady, N. Y.

RUSSIAN TRADE OPPORTUNITIES

An informal address at the morning session which attracted much attention was by F. B. Whitney, chairman of the Lake Torpedo Boat Company, Bridgeport, Conn. He said that recently the Russian Minister of Foreign Affairs invited Englishmen and Americans to investigate Russian trade opportunities. Germany has been selling Russia about one-half the latter's imports. England's percentage is about one-eighth and the percentage of the United States about five. Russia is the great unknown to Americans. The potential United States trade opening in Russia staggers the imagination.

Russia is the world's largest country, covering one-sixth of the globe's landed area. It has three times the landed area of the United States, excluding Alaska. With 171,000,000 population, Russia is the farmer nation of the world, three-fourths of the people being agriculturists. Less than a tenth of this immense population is engaged in industrial lines. Russia's inspected factories number only about 17,000, and her factory workmen a few over 2,000,000. Approximately 77,000 men are engaged in mining, notwithstanding that Russia is a bonanza mineral field that has scarcely been touched. There are 900,000,000 acres of practically virgin timber. These figures indicate that Russia has an abundance of foodstuffs and raw materials and very little of domestic manufactures. Russia's great exports are foodstuffs and her greatest imports are metal goods and manufactures. Her foreign trade exceeds \$1,250,000,000, with imports of over \$500,000,000. About one-eighth of the imports are metals and manufactures. Machinery is imported in excess of \$74,000,000, of which Germany has 55 per cent. and England about 12½ per cent.

Germany needed Russia's foodstuffs and raw materials and exchanged therefor principally German machinery, chemicals, etc. Excepting hides and wool, the United States has a superabundance of most of Russia's classes of exports; consequently, Russia must make settlement in cash for the American importations, if there is to be any great expansion of trade. Fortunately, Russia has a strongly established financial system that can handle largely increased amounts of American products. Probably the greatest opening for in-

creasing this country's exportations to Russia is machinery. The chances cannot be estimated, because Russia's commerce and industry are in an embryonic stage.

EXTENT OF OUR PRESENT TRADE WITH RUSSIA

The United States imports from Russia average about \$27,000,000, and consist principally of hides and skins, \$19,000,000; raw wool, \$2,665,000; fibers, \$1,000,000; roots, fusil oil and scrap rubber make up the greater part of the balance. The imports trebled in the last ten years.

United States exports to Russia average \$25,000,000. The principal items are agricultural machinery, \$8,650,000; twine, \$1,330,000; raw cotton, \$4,500,000; manufactures of iron and steel, including cash registers, typewriters, pumps, etc., \$5,500,000. The total increase in the last ten years is \$9,000,000. The normal growth and inevitably rapid expansion of Russia's interest in land, timber, mines, factories and railroads, will call for immense amounts of machinery, "in which the United States leads the world in excellence."

Mr. Whitney said in conclusion: "Having been interested in business to the extent of several millions of dollars in Russian industrial affairs, and having lived off and on for over two years in Russia, your speaker feels it a duty to suggest to the convention that American manufacturers, in planning a campaign on the stormy seas of trade expansion, should keep a weather eye on the main chance—Russia, whose foreign minister has thrown the doors wide open and put out the soft mat of 'Welcome.' "

PRESIDENT FARRELL ON THE EXPORT SITUATION

A leading address of the meeting was that given by James A. Farrell at the dinner of Thursday evening. He said in part:

"Our people have learned that a larger outlet is necessary for their products and that grain and cotton could be affected in a dislocation of the world's markets, although little thought had been given nationally to the vital importance to the whole country of a greater diversification of exports and of wider markets. Among the current economic fallacies is that, with the present elimination of several of the manufacturing countries of Europe as sources of supply, the neutral consuming markets of the world must look to the United States for their requirements. Manufacturers and merchants have been exhorted to expand their trade activities in markets supposedly vacated by the warring nations.

"Bankers have learned that credit is an international commodity, and producers, whether engaged in farming or manufacturing, now appreciate that it requires an exchange of commodities between countries to maintain equilibrium of gold exchange. It is apparent that even a neutral nation cannot materially profit when a world-wide contraction exists of the mechanism of credit and the cost of foreign exchange. The problems at present confronting the export and import trade of the United States are largely due to the inability of the foreign buyers to finance transactions on a credit basis, due to straitened financial conditions in many export markets.

"Manufacturers who export a portion of their product were compelled to curtail operations. Manufacturers engaged in what they considered purely domestic business, and who had long been indifferent to the necessity of fostering American foreign commerce, were in many instances deprived of the foreign materials essential to fabrication of their product. Farmers seeking customary loans to move their crops encountered a money stringency resulting from demands for gold to satisfy maturing American indebtedness in Europe which could not be liquidated by merchandise.

NO LACK OF VESSELS NOW

"Our commerce, supposedly neutral, suffered as though it were that of a belligerent. The utmost exertions of the Government and of finance and industry were brought into play. Just when a resumption of former prosperity seemed assured because of our bountiful crops it became necessary to apply for the first time the provisions of the emergency currency act. Deprived of its normal outlets for cotton and other natural commodities, as well as manufactures, the nation was literally overstocked with commodities of all kinds.

"At present there is no lack of shipping facilities, as there are more ships than cargoes to all parts of the world. The greater part of our oversea commerce is still being carried in foreign ships, and is, therefore, vulnerable to the hazards of war. Up to the present 77 foreign-built vessels, aggregating 275,000 tons, have been transferred to American register, a comparatively small number when it is considered that upward of 2,500,000 of foreign flag tonnage is owned by Americans; but many more vessels would doubtless be transferred to the American flag if prudent revision of our navigation laws were made, rendering operation of American vessels possible on a basis fairly competitive with ships of other nations, and until this is done capital cannot be expected to purchase or build ships and operate them at a loss in oversea trade. We need more liberal navigation laws rather than subsidies."

Other addresses at the convention or at the dinner were made by Franklin Johnston, publisher the American Exporter; George H. Richards, manager foreign department Remington Typewriter Company, on "The Personal Factor in Foreign Sales;" William H. Douglass, president Arkell & Douglass; Herbert R. Eldridge, National City Bank; Prof. Jeremiah W. Jenks, New York University, and Dr. Edward Ewing Pratt, chief of Bureau of Foreign and Domestic Commerce, Washington.

THE WAR AND FOREIGN TRADE

Export Developments of the Week

As fully commented on elsewhere, the buying of lathes for Europe has been one of the most sensational happenings in the machine tool industry in years.

Exports from New York City have been growing in a marked way. For the first three days of last week they were \$13,200,000 or within \$2,000,000 of the total for the entire week preceding. It was estimated that last week's movement closely approximated \$20,000,000, establishing a record for a single week's shipments from New York.

The British War Office has placed orders for 200,000 shells in Canada, involving an expenditure of about £400,000, the work being distributed among a number of plants. It is specified that as much as possible of the material shall be Canadian. The Nova Scotia Steel & Coal Company has secured a large contract for turning out shells in the rough.

The Thomas B. Jeffery Company, Kenosha, Wis., has been awarded a contract for furnishing 150 armored artillery motor trucks, of the Jeffery quadruple drive type, for the French government. The order was placed through France's American purchasing agent.

An officer of the International Harvester Corporation is quoted as saying that the business outlook is much better than sixty days ago, due to the improved financial situation. Exports have not been resumed in any substantial way, but the conditions in this country are steadily improving. While the corporation's plants abroad have been undamaged so far, the factory at Lille, France, is in a dangerous position, as it is between the German and allied armies.

Among reports of the week, of which, in the nature of the business involved, official information cannot be expected, is the statement that the Bethlehem Steel Company has taken a contract to furnish field guns to the French government, the total amounting to a good many millions of dollars.

The Dry Goods Economist strongly favors the use

of "Made in U. S. A." as the national trademark rather than "Made in America" or "Made in United States," and its position is indorsed by a number of manufacturing companies besides merchants' and manufacturers' associations.

A pamphlet on foreign trademarks, intended for free distribution, has been prepared by Lawrence Langner, a solicitor of patents, Singer Building, 149 Broadway, New York City. The pamphlet is one of 7 pages and covers tersely the question of piracy of trademarks in Latin-American countries, the forms of piracy, imprisonment for infringement and the suggestion how to avoid piracy.

Information on Trade Opportunities

The Alexander Hamilton Institute, research department, Astor Place, New York, has published a "War Map of American Trade Opportunities." This map is understood to have been the work of Prof. Jeremiah W. Jenks, of the University of New York, the eminent statistician. It is printed on a large sheet, giving the outlines of the various countries of the world on Mercator's projection, stating in connection with each country the manner in which its imports have been suspended by the European war, and thus presenting opportunities for increasing the trade of the United States. On the reverse of the sheet is presented a tabular statement of American industries. This statement comprises 177 industries, in which are given the number of people engaged, the capital employed, the value of the annual production, the total annual exports and the percentage sent to Europe, the total annual imports and the percentage received from Europe, effects of the war on foreign trade, its effects on prices, etc.

Decline in German Pig-Iron Output

The German Iron and Steel Association reports that the production of pig iron in August was 625,927 metric tons, against 1,564,345 tons in July, 1914, and 1,640,016 tons in August, 1913. It was made up as follows, the figures in brackets showing the production in July: Foundry iron, 97,788 tons (259,942 tons); Bessemer, 23,162 tons (19,076 tons); Thomas, 390,658 tons (1,045,586 tons); steelmaking and spiegel, 100,305 tons (203,968 tons); and forge iron, 14,014 tons (35,773 tons). The output in August was therefore equal to only 38 per cent. of that of August, 1913.

The London Ironmonger notes that the United Steelworks Burbach, Eich, and Düdelingen announce that their mines at Rümelingen, Düdelingen, Beles, and Differdingen, will shortly resume work on normal lines, and that all their old hands will be taken on again on application. Iron and steel workers who want temporary jobs in the mines are also asked to apply. There are prospects that the company's iron and steel works will also shortly be started again. At Dortmund there is said to be less unemployment. The Hoesch steel works have taken on 300 new hands.

The Upper Silesian iron works have raised the selling prices of bar iron, sheets, foundry products, steel castings, hoops, and constructional iron in small sections by 15m. to 20m. per ton.

Review of the German Steel Trade

Based on extracts from German papers the London Iron and Coal Trades Review of October 16 makes the following résumé of the German steel trade: During the last week business in pig iron has grown. The demand has, however, chiefly been limited to the better qualities, which are used for army requirements, and there has been but little inclination to make contracts. At the same time the works have obtained some orders, especially for immediate delivery, so that the output for September will be larger than might have been anticipated. The removal of the restriction on the export of most iron and steel products to neutral countries has also contributed to the improvement of business. In the bar market no new business has been booked, but works are pressing customers to execute orders booked previously, which has resulted in some increased ac-

tivity. The prices have not been uniform, and are not likely to be so, because the steel works union has decided not to make any further official increases as long as the war lasts. The Joist Association is not altering prices until the end of October, but it is pressing deliveries. Considerable quantities of Swedish iron ore have arrived via Stettin, and have been directed to Upper Silesia, while Rhenish Westphalian districts have secured some supplies via Lübeck. This has been facilitated by the reduced railroad tariffs put into force for the transport of iron ore. The Lorraine and Luxembourg and Nassau ore districts are suffering from a great shortage of cars, but there is very little work being done in the two first-named districts. Siegerländ iron ore is offered at the same prices as recently, but the reduced output from the mines will probably only satisfy the requirements for ore of the iron works in the district itself. The quotation for Swedish ore is somewhat higher than hitherto in consequence of the increased sea freights. As regards manganese, the works are said to have sufficient stocks on hand to last for some considerable time and there is no fear of an immediate shortage.

PERSONAL

Charles M. Schwab sailed for Europe last week for a short trip, expecting to return on the first ship sailing after his arrival in England. He referred to the iron and steel industry as being in the worst condition he had ever known, output being less than one-half capacity. The number of employees at the Bethlehem works is the lowest in nine years. Mr. Schwab, however, looks for material improvement, believing there will be an important increase in export business next year.

Pennock Hart has been elected president of Mackintosh, Hemphill & Co., Pittsburgh, succeeding Joseph Fawell, deceased. Mr. Hart has been connected with the company since its incorporation as a limited company about 35 years ago. For nearly 30 years he has been treasurer and will continue to act in this position. His father was the late N. F. Hart, who, with James Hemphill and Dr. Mackintosh, organized the firm of Mackintosh, Hemphill & Co. in 1858. It is one of the oldest concerns in the Pittsburgh district, building engines and general steel-works equipment.

J. M. Studebaker, South Bend, Ind., the last of five brothers who developed the largest wagon manufacturing industry in the world, celebrated his eighty-first birthday anniversary October 10. He spent the day as usual in the office of the Studebaker Corporation.

J. Howard Oddy, a representative of American manufacturers in South Africa and himself an American, is spending a short time in the United States partly in the interest of enlarging the number of his connections.

Sydney E. Junkins has tendered his resignation as vice-president of Westinghouse, Church, Kerr & Co., New York.

Dr. Karl G. Frank, 90 West street, New York, has returned from a several months' business stay in Germany. He is the American representative of the Siemens & Halske Company, Berlin.

L. N. Burns, general sales manager for the J. I. Case Plow Works, Racine, Wis., was elected a director of the company at the annual meeting and later was elected secretary to succeed H. M. Wallis, Jr. The latter has retired to devote his entire attention to the production and sale of Wallis tractors, manufactured at Cleveland, Ohio, by the Wallis Tractor Company, which he organized more than a year ago with \$500,000 capital. The position of treasurer of the Plow Works, also held by Mr. Wallis until now, was filled by the election of W. M. La Venture, in charge of traffic and purchasing. H. M. Wallis, Sr., continues as president.

John Grey, formerly superintendent of the galvanizing department of the Parkersburg Iron & Steel Company, Parkersburg, W. Va., has resigned, and is now connected with the Lalance & Grosjean Mfg. Company, Harrisburg, Pa.

Eugene C. Banister, slag engineer for the Carnegie Steel Company at the Ohio works, Youngstown, Ohio, has resigned to accept the position of slag engineer and salesman for the Duquesne Steel Products Company in the eastern territory, and will have his headquarters in Philadelphia. He was presented with a traveling bag by the office employees at the Ohio works.

D. Brewer Gehly has been elected treasurer of the Cambria Iron Company, succeeding Alex P. Robinson, resigned. He is also treasurer of the Cambria Steel Company.

Dr. David T. Day, who has long been connected with the United States Geological Survey, has resigned to engage in private practice. He has been the author of the Geological Survey's annual report on petroleum. The report on the production in 1913, just issued, is the last which will bear his name as author.

C. S. Rindsfoos, secretary-treasurer of the Foundation Company, and N. C. Failor, manager of the machinery department of the Canadian Fairbanks Morse Company, announce their resignations from those companies on November 1. Mr. Rindsfoos, after graduation as civil engineer from Cornell University in 1906, associated himself with the Foundation Company, then became New York City superintendent and for the past two years has been secretary-treasurer. A large part of his time was devoted to the purchase of machinery and materials of construction. Mr. Failor is also a Cornell graduate, with a degree of mechanical engineer. He was sales engineer for the Niles-Bement-Pond Company for four years, and for the past four years has been with the Canadian Fairbanks Morse Company. They have now associated in the formation of the United States Purchasing Company, the object of which is to effect the economical purchase of machinery and supplies for large buyers, both domestic and foreign. They announce that, among other clients, they have arranged to continue to act for the Foundation Company and the Canadian Fairbanks Morse Company.

George L. Fairbank has resigned as vice-president of the Struthers Furnace Company, Struthers, Ohio, with offices in Cleveland, and has severed connections with that company, with which he has been associated 18 years.

Pittsburgh and Nearby Districts

The report that the Logan-Gregg Hardware Company, whose large warehouse and offices on Seventh street, Pittsburgh, were destroyed by fire recently, has decided to build an eight-story brick, concrete and steel building, is incorrect. President George B. Logan states that a number of sites have been offered, but none has been accepted. The company owns the property on Seventh street, but more room is needed than that affords, and if a new site is selected, the old one will be sold or used in a trade for the new one.

The Girard Iron Company, Girard, Ohio, has blown out its Mattie furnace on account of dull conditions in the steel trade. Only four merchant furnaces in the Mahoning and Shenango valleys are now in blast. These are one stack of the Shenango Furnace Company, Sharpsville, Pa.; Stewart, of the Stewart Iron Company, Ltd., Sharon, Pa.; Struthers, of the Struthers Furnace Company, Struthers, Ohio, the output of which is sold by W. P. Snyder & Co., and one stack of the Andrews & Hitchcock Iron Company, Youngstown, Ohio. One stack of the Shenango Furnace Company is banked and the third is out.

Appraisement of the assets of the Pittsburgh-Westmoreland Coal Company, which went into the hands of receivers July 29, is given at \$13,676,115, in the report by Julian Kennedy and R. C. Crawford, appointed appraisers by the United States District Court. Net obligations of the company, including current and general indebtedness, are about \$6,800,000.

The Whitaker-Glessner Company, Wheeling, W. Va., has made a 10 per cent. reduction in salaries of all officers and heads of departments, and a reduction of working days, depending on the amount of work to be done, of all other employees. The action affects the employees of the Whitaker-Glessner Company, Wheeling Corrugating Company, and Portsmouth Steel Company. The company states that the reduction is reluctantly made because of the seriously depressed condition of the iron trade and the necessity for retrenchment in expenses.

The annual meeting of the stockholders of the Carson Steel Company was held in Pittsburgh, October 19. The following directors were elected: Charles McKnight, George S. Macrum, C. E. Middleton, D. R. Wilson, all of Pittsburgh; Gilbert G. Thorne, Edward C. Hoyt and Edward F. Slayback, all of New York. The directors organized by electing Charles McKnight, president; Gilbert G. Thorne and George S. Macrum, vice-presidents; D. R. Wilson, treasurer, and W. W. Noble, secretary. The executive committee consists of Charles McKnight, George S. Macrum, C. E. Middleton and D. R. Wilson.

On October 23 and 24 the Youngstown Sheet & Tube Company, Youngstown, Ohio, paid its employees about \$200,000 as a cash bonus, this being about 3 per cent. of their earnings for the past year.

The LaBelle Iron Works, Steubenville, Ohio, has made a reduction of 10 per cent. in salaries of all executives and operating officials effective December 1. The reduction does not apply to tonnage men or other blast-furnace or steel-works labor.

The Interstate Commerce Commission has decided in the case of the Pittsburgh & Southwestern Coal Company, et al., vs. the Wabash-Pittsburgh Terminal Railway Company, et al., in which it is held that the combination carload rates on bituminous coal from points on the Wabash-Pittsburgh Terminal Railway in Pennsylvania to destinations in other States on and reached by the Pittsburgh & Lake Erie and Baltimore & Ohio railroads are unreasonable to the extent that they exceed by more than 10c. per ton joint carload rates on bituminous coal for hauls to the same destinations from mines on the West Side Belt Railroad. The defendants are, therefore, required to establish joint rates from points on the Wabash-Pittsburgh Terminal Railway in accordance with the finding of the commission.

It is understood that the Baltimore, Rochester & Pittsburgh Railroad will make material enlargements to its machine shops at Bradford, Pa. The company intends to manufacture steel underframes for cars it owns that are not of all-steel construction. It is stated that upward of 5000 cars will be equipped with steel frames.

The Reznor Stove Company, Mercer, Pa., has received an order from the French Government for 50,000 sheet-steel tent stoves. These stoves are so built that they can use oil, gasoline or wood for fuel. A good part of the order has been shipped.

The Chicago Foundrymen's Club held its first fall meeting at the Hotel Sherman on the evening of October 17. At this meeting Dr. Waelke reviewed the meetings of the Safety Congress just held at Chicago and described some of the work of the safety department of the Crane Company. Impressions obtained at the Foundry and Machine Exhibit held in connection with the convention of the allied foundry associations were presented by members of the club in an informal discussion.

The Mulconroy Company, Fifty-fourth and Jefferson streets, Philadelphia, Pa., announces that it has recently taken over the all-metal hose business of the Schoen-Jackson Company of Pennsylvania, acquiring all its patent rights, stock, machinery and experienced workmen, and that it is now manufacturing all-metal hose of all types, single and double groove and interlocking, and the couplings.

OBITUARY

James H. Le Fevre

James Hasbrouck Le Fevre, vice-president and general manager of the Electric Steel & Metals Company, Ltd., Welland, Ont., died October 23, from burns caused by an explosion which occurred at the turning on of the electric power at the new plant. He was in his forty-fifth year and was of Dutch Huguenot descent.

After his graduation from Rutgers College, Mr. Le Fevre entered the employ of the Pennsylvania Steel Company at Steelton, Pa. Later he held important positions with other steel concerns of the United States



JAMES H. LE FEVRE

and Canada. He was widely known for his ability as a metallurgist, and manufactured the first steel made in Canada at the plant of the Dominion Iron & Steel Company, Sidney, Nova Scotia. He was one of the promoters of the Electric Steel & Metals Company, whose plant is being made ready to manufacture shells for the British Government. He was also vice-president of the Standard Tube & Fence Company, Woodstock, Ont. He leaves his widow and two sons.

JAMES GREEN, chairman of the board of directors of the Laclede-Christy Clay Products Company, St. Louis, died October 19, aged 85 years. He was one of the wealthiest men of St. Louis, and was the first to manufacture firebrick and similar products in the West. He was a director of the Mechanics-American National Bank and the Guardian Trust Company. He was a native of England, being born in Staffordshire, but came to America in 1852, first working in rolling mills and was in charge of the old Laclede Rolling Mills, St. Louis, until 1874. He leaves his widow and two sons.

ROBERT H. JOHNSTON, who organized and was the first president of the Cleveland Coal Exchange and was for many years the president of the Johnston & Jennings Company, of Chicago and Cleveland, manufacturer of sash weights, died October 25 at his home in Upper Montclair, N. J., aged 73 years. He was born in Ireland and was brought to America as an infant. He served in the civil war with the Ninety-eighth Ohio Regiment. He leaves his widow, two sons and a daughter.

EDWIN HAWKRIDGE, president Hawkridge Brothers Company, Boston, steel merchant, died October 21, aged 60 years. He was born on Long Island, N. Y., went to Boston in 1881, was for some time manager for the Fuller, Dana & Fitz Company, and in 1883 started in the steel business with his brother, John F. He leaves his widow, a son and two daughters.

The Machinery Markets

The placing of orders for at least 1700 engine lathes, mostly for foreign shipment, is the popular subject of discussion in machinery circles, while not overlooked is the fact that automatics and turret lathes have enjoyed a heavy sale also, the purchasers being largely American firms who have taken orders for shrapnel and other war appliances. It is learned that some machine tools have been shipped to Germany by way of Denmark and Norway. There is a better tone all around, partly due to a slight revival of ordinary domestic demand, and it is believed that every branch of the machine tool industry will soon be profiting from the general buying which is going on in behalf of the countries at war. New York has had its share of the war business and more is in sight. Many manufacturers in New England have been rushed in filling orders and a continued improvement is indicated. In Cleveland there has been a better volume of foreign buying, while there is an improvement in the demand for coal and ore handling apparatus, as well as in single tool orders. A few machine tool makers in Cincinnati are working double time on war business, others expect to increase their hours and meanwhile the domestic demand is on the mend. While Chicago has received no orders for exceptional groups of tools, several inquiries and sales are traceable to war influences and a better domestic demand. Conditions in Milwaukee are better, both as regard domestic and export demand. Business in the Central South is at a low level, and in the Birmingham district, also, activity is at a minimum. The machine tool trade is dull in St. Louis, but there is nevertheless a more cheerful feeling. In Texas the machinery and tool trade is sluggish, but contemplated irrigation projects promise a demand for pumping equipment. The Pacific Northwest call for machinery tools is rather quiet, with the bulk of the demand coming from lumber and shingle mills. Electrical equipment is in some demand in Alaska where several large projects are under way.

New York

NEW YORK, October 28, 1914.

The large sales of engine lathes and other tools which have been made to European countries, which are discussed in detail in the New England market, as well as the purchasing of various tools by American makers of ordnance and projectiles, to which may be added a turn for the better from more domestic and pacific directions, has given the local market a far better tone than existed two weeks ago. It is pointed out that the pressure of foreign demand for innumerable commodities eventually will have a favorable effect on all types of machinery.

While the stocks of most manufacturers of engine lathes have been exhausted of several sizes, there are still a few of such machines left. The W. P. Davis Machine Company, Rochester, New York, for instance, has in stock six 14-in., three 18-in. and seven 20-in. lathes. The demand has been particularly heavy on the Niles-Bement-Pond Company, and the trade has seen the rare spectacle of that company, with its great facilities for production, turning to other manufacturers to supply it with machines.

One reason for the rush with which orders have been placed and which in itself makes it difficult to gauge the aggregate of business, is that shipments to Russia are being made by way of Archangel, which is so near ice-bound that it is kept open by means of ice-breakers. It is understood that the last ships to clear for Archangel, which is at the fringe of the Arctic Ocean, will sail this week. In the last few days the Baldwin Locomotive Works, Philadelphia, placed orders for at least 150 lathes for Russian shipment, as well as a number of turret lathes, of which it inquired for 50.

Reports indicate that there are or have been in this city three Canadian commissioners who have been chiefly interested in miscellaneous army supplies, two French commissioners, Capt. Larrouilloux and Mons. Rousseau, who have been at the Hotel Brevoort, interested in shrapnel, automobile trucks and miscellaneous materials; and English and Russian representatives buying machine tools, projectiles, trucks, etc. It is said that the French representatives are seeking to place an additional order for 500,000 shrapnel in this country, each shell representing an approximate value of \$10. A number of manufacturers are turning their attention to the production of these shells. A pipe and pipe bending concern in Pennsylvania, which has been forging blanks, is contemplating the completion of the shells. An eastern Pennsylvania steel mill is turning the blanks out in its forge shop. The Dominion Bridge Company, Montreal, Canada, is engaged in making shrapnel, as well as some of the Canadian railroad shops.

A news dispatch from Bethlehem says that the Bethlehem Steel Company has a contract to supply France with nine hundred 6-in. guns. While this has not been confirmed, the trade accepts it as true and says that the guns are being but partly finished here. A Philadelphia dealer received an order for shaping and milling machines as well as engine lathes from the Bethlehem Steel Company.

An Eastern manufacturer of specialties has put out an inquiry for 40 engine lathes and 15 grinders, it is believed for the making of war materials.

The Transcontinental Railway of Canada, which is building near Quebec a duplicate of its shops at Transcona, Winnipeg, is preparing a list of equipment which will be in readiness for the trade in about six weeks. The expenditure will amount to about \$500,000.

N. E. Booth, manufacturer of felt, 644 Pacific street, Brooklyn, N. Y., has incorporated as the Booth Felt Company. The factory equipment and offices have been removed to 440-450 Nineteenth street, Brooklyn.

The Aircraft Company, 1737 Broadway, New York City, has increased its capital stock from \$50,000 to \$500,000. John E. Sloane is president and M. R. de Miege, vice-president.

The National Lock Washer Company, Johnson and Hermon streets, Newark, N. J., has drawn plans for a power house but has not yet formulated plans for its construction.

The Circular Plane Monoplane Corporation, Rochester, N. Y., has been incorporated by F. A. Geiger, W. P. Davis and J. F. Claesgeus, with a capital stock of \$50,000. Manufacturing plans are not available.

The Seaburg Mfg. Company, Jamestown, N. Y., plans to install a gas heating system in its new factory.

The Universal Chain & Metal Stamping Company, 806-810 Greenwich street, New York City, has been incorporated by Brinton Carrigan and others, and has purchased the United States Tool & Metal Stamping Company, 442 Water street, New York. It will manufacture a line of plain and fancy brass and steel chains for suspending electrolyzers. Plans for a new factory have not yet been formulated. Brinton Carrigan is president and Louis Arons, plant manager.

The Heath Machine Company, Lestershire, N. Y., has purchased the machinery for the addition it is building to its foundry.

Mayville, N. Y., has voted \$9700 for equipping the village power plant, to take electric power from the Chautauqua Traction Company.

Weedsport, N. Y., has voted \$18,000 for a municipal lighting plant.

The Lloyd Preparation Chemical Company, Buffalo, capitalized at \$50,000, has been incorporated to manufacture drugs and chemicals by I. C. McDonald, D. O. Palmer and L. J. Ross.

Revised plans are being prepared and bids will soon be taken for the factory and office building at Niagara Falls, N. Y., for the Santo Rubber Company, E. T. Brockman, president, Oliver Building, Pittsburgh, Pa. The main building will be 82 x 250 ft., two stories, of brick construction. The estimated cost is \$100,000.

The Chamber of Commerce, Cuba, N. Y., is erecting a manufacturing building, 38 x 121 ft., to be leased to a company whose name is withheld for the present.

The Westchester Lighting Company, Tarrytown, N. Y., has completed plans for a repair shop which it will erect at once.

The Atlas Production Company, Buffalo, has been incorporated with a capital stock of \$50,000 to manufacture foundry and machine-shop supplies, hardware, etc. G. L. Schupp, A. C. Lehman and W. A. Hyle are the incorporators.

The plant of the James H. Gray Milling Company, Springfield, N. Y., was destroyed by fire October 24, with a loss, including damage to machinery, of \$25,000. It will be rebuilt.

Philadelphia

PHILADELPHIA, PA., October 26, 1914.

The Pennsylvania Steel Company is in the market for two rail drills and it states in its inquiry that it may purchase four or six similar machines.

Smith, Drum & Co., 2503-2509 Coral street, Philadelphia, Pa., manufacture machines for dyeing and finishing hosiery and underwear, etc., but not for finishing and dyeing cloth, as has been stated. Plans for the new factory include the installation of a powerful traveling crane.

The Specialty Engineering Company, Emerald and Corn-wall streets, Philadelphia, Pa., is building a two-story brick and concrete factory, 50 x 100 ft.

W. A. Cartwright, 1321 North Third street, Harrisburg, Pa., plans to install an ice-making plant of 65 tons capacity.

Joseph Bancroft & Sons Company, Wilmington, Del., will erect a factory, 48 x 140 ft., to cost \$25,000.

Gilson's Garage, Cumberland, Md., is in the market for second-hand engine, lathes and other machinery.

New England

BOSTON, MASS., October 27, 1914.

The American builders of engine lathes in the sizes of 14, 16 and 18 in., have sold for foreign shipment 1700 machines in the last two weeks, aggregating about \$750,000, and inquiries for 1000 more lathes are out and without doubt will develop into orders in the immediate future. The lathe committee of the National Machine Tool Builders' Association, at its session last week in connection with the annual meeting, made a careful canvass of recent orders, and learned these facts. If 1000 additional lathes are included in this new export business the money received will be somewhere about \$1,250,000. This does not mean the total of lathe orders for export received since the war commenced. Previous to this new business many machines were disposed of for shipment to England. A large portion of the recent purchases will go to Russia. The orders were received from no one source. Some came direct by cable; others through agents in the United States, and a few from personal representatives of the Russian government. The first lots of lathes had to be ready for immediate shipment; no time was permitted even for assembling finished units. Stocks were pretty well cleaned out. The additional 1000 machines—and very likely the number is by now much larger—will for the most part have to be assembled, but will require little actual manufacturing.

These recent orders are for lathes of the plainest types. Few have even the quick change gear mechanism. Earlier orders were for machines of the highest power. Some of them went abroad, others were for use in the United States, presumably on war materials. The plain lathe of the 14, 16 and 18 in. sizes will be out of the market until the manufacturers replace their stocks. And they state that they will be conservative in their manufacturing operations. Therefore the forehanded buyer will be at an advantage when the tide has really approached its flood stage.

In the talk about lathes—and it predominated the machine tool convention—the fact was lost sight of that other types of machinery are in active demand, chiefly for export. The larger sizes of automatics, the cylindrical grinding machines which finish the products of medium sized lathes, screw machines and certain types of milling machines have been purchased freely. Planers, shapers and drilling machines are not enjoying a ready market, though some of the builders of sensitive drilling machines are busy.

The total sales of machine tools in the last six weeks represent an imposing figure. The lathe account is by no means the big part of the total. But a natural inclination to conceal new business makes it impossible to do more than generalize on the subject.

Orders for goods which will be used by foreign armies are accumulating, and the record week's exports should reach a much higher figure in the immediate future. It should not be lost sight of that nearly all of this business is on a cash

basis, which means large additions to the country's credit balance. A British inquiry is for 100 carloads of horseshoes. In Springfield, Mass., the Knox Motors Company has received a large foreign order for motor trucks and the Hendee Mfg. Company large orders for motor cycles for military purposes. The firearms people everywhere are loaded with business, and so too are the manufacturers of ammunition, which means a stimulus to the sheet brass industry. The shoe manufacturers are profiting largely, not only because shoes are required for the fighting men, but because the European factories are not able to supply the demands of the civilian population. Large inquiries for women's shoes have been received. Tanned hides are being purchased from New England in great quantities. Sweaters, underclothing, stockings, blankets and so on through the list of clothing required by an army in the field, are included in the general list of inquiries and orders from Europe.

Some degree of essential domestic demand has been created by the shutting off of imports from Europe. The toy makers of New England and other parts of the country are active to the extreme limit of their production. With Christmas approaching, and the absence of the usual supply of German toys, the deficit has to be made up in the United States. It is not toys alone, but most of the various articles which come in the category of Christmas gifts. The same condition exists to a greater or less extent in every American industry which has been compelled to compete with cheap foreign labor.

The new building which the Union Metallic Cartridge Company will erect at Bridgeport, Conn., will be 48 x 240 ft., with an ell 48 x 48 ft., four stories and basement. The structure will be of brick and steel and fireproof.

The Boston Branch, National Metal Trades Association, is about to move its offices from 141 Milk street to rooms 601-602 Marshall building, 40 Central street, corner of Broad street, near the Custom House. Occupancy of the new quarters will begin Monday next. The building has just been completed and affords all modern conveniences.

The Standard Wash Tray Company, New Haven, Conn., will build an additional factory, 150 x 175 ft., one story, of concrete construction.

The Manhasset Mfg. Company, Putnam, Conn., will build a two-story addition, 56 x 99 ft.

The Potter & Johnston Machine Company, Pawtucket, R. I., is proceeding rapidly with the construction of its British plant at Coventry, England. The shops will produce the Potter & Johnston chucking lathes and the Gridley automatics and multi-spindle drilling machines built by the Windsor Machine Company.

A. N. Wetherbee, Lyndonville, Vt., will rebuild the Novelty Works factory on a site which he has purchased near the Lyndon station. The building will be 32 x 120 ft., two stories, with one story wing 28 x 32 ft. Mr. Wetherbee will manufacture tops and wood turnings and will require variety lathes, belting, shafting, pulleys and two electric motors.

Indianapolis

INDIANAPOLIS, IND., October 26, 1914.

The H.-K. Electric Toy Company, 702 West Morris street, Indianapolis, Ind., has purchased the Kindergarten Toy Company, Indianapolis, and will move its plant to that of the latter company. Electric motive power will probably be required.

The National Pin & Bracket Company, North Vernon, Ind., has awarded the contract for the construction of a two-story factory, 30 x 72 ft., for the manufacture of wooden insulator pins, etc.

The plant of the Caldwell Mfg. Company, Columbus, Ind., has been sold to the Alexander Spreader Company, Lebanon, Ind., which plans to increase the equipment of the factory and to make manure spreaders and other farm machinery.

The Standard Auto Supply Company, South Bend, Ind., has been incorporated with \$10,000 capital stock to manufacture and deal in auto accessories. The directors are Charles, James and J. E. Scott.

Buildings are in course of erection at Laporte, Ind., for the plant of the United States Slicing Machine Company, which is to be moved from Chicago.

The Roann Light & Power Company, Roann, Ind., has been incorporated with \$10,000 capital stock to furnish light and power. The directors are G. R. Brodbeck, L. Laven-good and B. E. Goltry.

The City Council, Michigan City, Ind., has appropriated \$50,000 for improvements to the waterworks plant.

Dyer Brothers, Muncie, Ind., who have been operating machine shops, have sold their business to Charles B. Atherton, who will add a number of new tools to the shop equipment.

Chicago

CHICAGO, ILL., October 26, 1914.

While there has been no booking of exceptional orders for groups of tools such as have been received in the East, there are traceable to the influence of the war a number of inquiries and sales and a general improvement in the volume of business. Orders for machine tools have for the most part been the indirect result of activity in specialized lines, the meat packers and tanners particularly being in receipt of export business that is taxing their capacity. There is still a complete absence of a railroad inquiry beyond an occasional requisition for a single tool. Miscellaneous inquiry noted during the week calls for a second-hand Corliss engine of about 150 hp., 11 x 12 in. second-hand Ideal center crank engine, 14 in. shaper and drill press. New construction in industrial plants seems for the time at least to have taken a little spurt, and below are a number of interesting undertakings for which a variety of equipment is to be purchased.

The Bates Expanded Steel Truss Company, 208 South La Salle street, Chicago, of which A. J. Bates is secretary, has begun the construction of the first of its plant buildings on a site of about 21 acres at East Chicago, Ind. It is 120 x 180 ft. and will provide for the manufacture of expanded metal telegraph poles. It is planned to follow the completion of the first building with others adapted to the manufacture of a general line of expanded truss structures for structural steel and concrete reinforcement.

The Justrite Mfg. Company, Chicago, manufacturer of hardware specialties, has acquired property at Southport and Hawthorne avenues, on which it will erect a plant to cost about \$100,000.

The Chicago Compressed Gas Company, 37 West Van Buren street, recently organized with Harry G. Austin as president, has taken property in the Clearing Industrial district and will erect a brick and concrete factory, 100 x 200 ft. It will manufacture oxygen gas, welding apparatus, and tanks for storage and distribution.

The Lake Shore & Michigan Southern Railway is about to build a one-story brick power house, 32 x 102 ft., on the Calumet River, near avenue N, at a cost of \$20,000.

Samuel L. Winternitz, Chicago, has made a bid of \$100,000 for the machinery and equipment in the plant of the bankrupt American Voiturette Company, Detroit. It is understood that the offer will prove acceptable.

The Chicago File & Rasp Company, 1926-1944 Webster avenue, Chicago, has purchased the entire machinery and equipment of the Racine File Company, Racine, Wis., giving it a battery of 42 cutting machines. This company previously had purchased the Kansas City File Works, Bell File Works and the Doig File Company. William Didriksen is manager.

The Great Northern Mfg. Company, manufacturer of bending machines, Rockton, Ill., is laying the foundation for its factory.

The Peerless Machine Company, Freeport, Ill., has been incorporated by W. P. Sisson, Edward Funke and A. J. Funke, with a capital of \$10,000 to manufacture plumbing fixtures.

Sandoval, Ill., has approved the issuance of bonds to the amount of \$4000 to cover the installation of an electric light plant.

The Orvil Light, Power & Water Company, Hartsburg, Ill., has been organized by Daniel Van Gerpen and others, with a capital of \$4000 to furnish current for electric light and power.

The Maher Mfg. Company, Libertyville, Ill., has been incorporated with a capital of \$50,000 by N. L. Maher, L. W. Maher and E. C. Armitage. It will manufacture lighting fixtures and automobile accessories.

It is reported that new boilers will be purchased for the waterworks at Waukegan, Ill.

The village clerk, Gray's Lake, Ill., will receive bids until November 2 for a deep well pump and motor.

Stronghurst, Ill., has voted \$12,000 worth of waterworks bonds. Foster Lazear is village clerk.

The National Cigar Vending Machine Company, Canton, Ill., has been incorporated with a capital stock of \$15,000 by C. L. Hughes, H. A. Ray, G. W. McGrew, and others, and will establish a plant to manufacture vending machines.

The St. Louis & O'Fallon Railroad Company, East St. Louis, Ill., will equip a roundhouse and machine shop. Superintendent W. E. Dudenbostel will be in charge.

William N. Rumely, proprietor of the Illinois Thresher Company, Sycamore, Ill., is considering the establishment of a branch plant for the manufacture of agricultural implements at St. Paul.

The Ft. Dodge, Des Moines & Southern Interurban Rail-

road contemplates the expenditure of \$150,000 for improvements and additions to its power plant at Frazer, Iowa.

The Osmundson Spade Mfg. Company, Perry, Iowa, suffered a loss of about \$15,000 from fire October 13.

Joseph Barnett & Co., Riverside, Iowa, manufacturers of lightning rods and fixtures, etc., have started the erection of a two-story addition to their factory.

Blair, Neb., has voted \$25,000 of municipal electric light plant bonds.

The Monarch Company, 593 Wabasha street, St. Paul, Minn., contractor for theater equipment, is in the market for a blower, fans, ventilators, etc.

Garrett O. House, superintendent of water department, St. Paul, Minn., has drawn plans for an increased storage capacity, calling for a 15,000,000-gal. pump, to cost approximately \$96,000.

The plan to issue \$135,000 of waterworks improvement bonds for Sioux Falls, N. D., has been approved.

The City Council, Duluth, Minn., has passed an ordinance appropriating \$85,800 for the first unit of the municipal electric plant.

The Northern Pacific Railroad, St. Paul, Minn., will build at once, at a cost of about \$155,000, a new group of shops in St. Paul, to include roundhouse and machine shops.

The Kiel Mfg. Company, Albert Lea, Minn., has started the construction of a factory, 50 x 120 ft., of hollow tile, to be completed by January 1.

Jerdee & Hendrickson, manufacturers of lighting fixtures, 2936 Thirtieth avenue, south, St. Paul, Minn., have removed to 804 East Lake street, in order to obtain increased space and facilities.

It is reported that the State School for the Deaf, Omaha, Neb., will install a power house, one story, of brick and stone construction, to cost \$30,000.

It is reported that the Ochs Brick & Tile Company, Springfield, Minn., is in the market for electrical machinery, including a 250-hp. motor, for its factory now being constructed.

Charles K. Shand, architect, Duluth, Minn., is preparing plans for a power house, to be erected at Aurora, Minn., at a cost of \$7000.

The Butler Mfg. Company, Minneapolis, Minn., is building a factory at 900 Sixth avenue, for fabricating steel, the cost of the plant to approximate \$25,000.

J. P. Kienzle has purchased the machine shop formerly operated by William Aab, New Ulm, Minn.

The Iowa-Minnesota Light & Power Company, Dodge Center, Minn., is in the market for four 30-kw., 2300 to 6600 volt transformers, and 10 miles of line material.

Cody, Wyo., has voted \$61,000 of bonds for a waterworks system at Powell.

The C. H. Dutton Company, Kalamazoo, Mich., is building a boiler shop of steel and concrete construction, 80 x 120 ft., to be completed by January 1.

The Holland Furnace Company, Holland, Mich., has completed plans for an addition to its plant, 90 x 100 ft., to be used as a sheet metal department.

The Fenn Mfg. Company, Charlotte, Mich., is rapidly completing its plant for the manufacture of scythes, snaths and post hole augers.

The Kellogg Toasted Corn Flakes Company, Battle Creek, Mich., is having plans prepared by M. J. Morehouse, 243 South Dearborn street, Chicago, for a power plant, to cost \$250,000.

Cleveland

CLEVELAND, OHIO, October 26, 1914.

An improved volume of foreign business has been done here with the countries at war. Orders from abroad placed with Cleveland machine tool builders in the past few days include 20 or more automatic machines and a number of other machine tools. There is a fair volume of domestic orders for drill presses. Dealers report a moderate single tool business, but very little inquiry for larger lots. In the case of a large share of single tool inquiries, the owner wants to trade old machinery for new. The outlook in coal and ore handling machinery has improved, in that business that has been in prospect for some time is expected to be placed shortly. In electrical equipment there is a demand for small motors and generators, but little activity in large units. Conditions in the foundry trade show a slight improvement.

The National Hinge Company, Cleveland, recently formed to manufacture a line of hinges, has been incorporated with a capital stock of \$50,000 by F. J. Townsend, H. L. Parmenter, and others.

The Flanner Water Tube Boiler Company, Akron, Ohio, recently incorporated with a capital stock of \$40,000, will build a plant in East Akron to manufacture the Flanner boiler which has been made in Toledo, Ohio, for several years. The company has been re-organized. B. D. Flanner will be treasurer and general manager. Other officers, all Akron men, are: George W. Krouse, Jr., president; J. K. Williams, first vice-president; J. W. Chamberlain, second vice-president, and H. R. Bader, secretary. The company has opened offices at 518 Second National Bank Building, Akron.

Sealed proposals will be received at the office of the city commissioner of purchases and supplies, Cleveland, November 4 for a motor-driven electric hoisting engine for the waterworks department and November 6 for an auxiliary air compressor for the municipal electric light plant.

J. H. Shepperd will establish a plant on West Railroad street, Elyria, Ohio, for the manufacture of sheet metal products, specializing on the products that are used by the fishermen along the Great Lakes.

The Franklin Advance Machine Company, Franklin, Ohio, has been incorporated with a capital stock of \$10,000 by J. G. Vance, J. J. Weismer, P. H. Rue, and others.

C. J. Sanzenbacher, county auditor, Toledo, Ohio, will receive bids until 10 a.m., November 6, for a heating and lighting plant for the Children's Home.

The board of county commissioners, Toledo, Ohio, will receive bids until November 6 for the construction of a power house and the installation of equipment.

The Champion Spark Plug Company, Toledo, Ohio, has arranged to take over the manufacture and selling of spark plugs formerly made by the Jeffrey-Dewitt Company, Detroit, Mich., which will confine its work to the production of porcelains. Some special machinery has been moved from the latter to the former plant.

Cincinnati

CINCINNATI, OHIO, October 26, 1914.

At least two local machine-tool manufacturers are working double time, necessitating putting on night shifts to turn out rush orders received lately. Another expects to start on double time this week, but it is understood that a delay in getting rough castings fast enough has kept him from doing so before now. As is known, most of the business in hand now is from Europe, including Russia, England, Italy and France. While orders previously received were almost wholly for lathes, a few milling machines have been bought lately, and there are inquiries out for more. The domestic trade is also on the mend, and considerable business is under negotiation including practically all kinds of metal-working machinery. It is presumed that most of these inquiries are from the auto-truck and automobile manufacturers.

Both wood-working equipment and second-hand machinery, of all kinds, are dull. The demand from the South, that was formerly a good field, has practically been cut off, on account of the cotton situation, but it is believed this condition will be remedied at an early date. Small electrical units are still being sold at a satisfactory rate.

The J. M. Robinson Mfg. Company, Cincinnati, manufacturer of light and heavy metal-working machinery, reports business as being very good. The company is operating a full force and on full time.

The Thurber & Browning Company, Cincinnati, has been incorporated with \$55,000 capital stock by E. P. Browning, H. Thurber, E. Wolf, A. F. Browning and J. K. Browning. It is engaged in engineering and construction work.

The Early & Daniels Company, Cincinnati, will soon let the contract for a reinforced concrete warehouse and large feed mill to be constructed on West Sixth street at an estimated cost of \$80,000. Milling equipment will probably be required later.

The Homan-Hughes Company, Cincinnati, shoe manufacturer, whose plant was recently destroyed by fire, is installing machinery in the Haberer Building on Gest street.

The Newport Rolling Mill Company, Newport, Ky., has let contract to the McClintic-Marshall Company, Pittsburgh, for a galvanizing building to take the place of the wooden structure now housing this department.

George Keller, Newport, Ky., will make a large addition to his grain elevator on Lowell street.

According to press reports, Middletown, Ohio, will purchase pumps for its waterworks, instead of repairing those now in use, as mentioned some time ago.

Joseph Kramer has purchased the plant of the Kramer Brothers Foundry Company, Dayton, Ohio. He was for-

merly secretary and treasurer of the company. No additions are planned.

The Columbus Basket Company, Columbus, Ohio, recently incorporated, has leased space in the Chapman Building and will soon commence the installation of machinery for the manufacture of wood fiber baskets.

The Franklin Advance Machine Company, Franklin, Ohio, has been incorporated with \$10,000 capital stock by J. J. Weismer and others. Nothing is known as to equipment needed.

Milwaukee

MILWAUKEE, WIS., October 26, 1914.

One of the marked features of an improving situation is the comparatively fine run of business that is falling to the lot of local machine-tool builders. It is a matter of much encouragement that part of this trade is the out-growth of the European war, belligerent countries now turning to the United States for equipment and making purchases on favorable terms of payment, which was a matter of considerable concern when American firms began to figure on business from European countries. In addition, domestic inquiry is brisk and purchases are assuming a larger volume, although the normal volume has by no means been reached. General trade is looking up and there seems now to be no question that the upward trend has set in with a will. Manufacturers of power-plant and miscellaneous shop equipment report good inquiry based principally on New Year buying. Collections show improvement and the general situation is one to cause optimism.

The Cigar Box Lumber & Mfg. Company, Sheboygan, Wis., is taking bids for the erection of its new main building, 60 x 140 ft., two stories; power plant, 35 x 50 ft.; dry kiln, 35 x 60 ft., and storage house, 25 x 25 ft., two stories. Plans were drawn by C. F. Ringer & Son, architects, Milwaukee. Charles Mosses is in charge.

The Kissel Motor Car Company, Hartford, Wis., which recently shipped 50 2½-ton trucks to the Greek Government, has received an order for 25 more of the same type. The source of the new order is not given. The working force has been slightly increased to fill the order promptly.

The Spring City Foundry Company, Waukesha, Wis., has awarded contract for the erection of an addition to its foundry, 60 x 112 ft. It specializes in castings for automobile engine cylinders and parts.

Sealed bids for the construction of the new high and manual training school for the city of Marinette, Wis., will be taken by the board of education, A. Z. White, secretary, until November 23. Plans by John D. Chubb, architect, Chicago, call for a steam heating system, boiler house, electric light and power plant.

The Cornell Wood Products Company, Cornell, Wis., is taking bids for the erection of a two-story addition, 68 x 265 ft., of brick and mill construction.

F. H. Losslyn and LeRoy Herron, Oshkosh, Wis., have purchased the controlling interest in the Weyauwega Electric Company, Weyauwega, Wis., including the water-power rights, and propose to remodel and add new equipment, and increase the capacity to give 24-hour service.

The Fairbanks-Morse Mfg. Company, Beloit, Wis., will remodel its power house, boiler and engine room, install new boilers and erect a concrete stack, 16 ft. in diameter and 235 ft. high.

The A. E. White Machine Works, manufacturer of saw swages and shapers, which has completed the work of remodeling its new quarters at Eau Claire, Wis., will defer the purchase of considerable new equipment and tools until its trade resumes normal conditions. The product is used by sawmills in the South and West, whose principal market is Europe. The company is operating with a normal force and stocking up on swages in preparation for a big run of business as soon as European lumber trade is revived.

The Taylor Motor Car Company has been organized at Eau Claire, Wis., with a capital of \$5000 by J. A. Taylor, F. N. Ferguson, F. N. Stillman and Alexander MacDonald to operate a garage, etc.

The Shaw Motor Company, Chicago, has decided upon the city of Prairie du Sac, Wis., for the location of its new plant. Plans by Joseph Dresen, architect, Prairie du Sac, will call for a brick and concrete shop building, 60 x 108 ft., one story, with saw tooth roof, equipped for the production of gasoline engines. The investment will be approximately \$35,000.

The West DePere Creamery Company, West DePere, Wis., is in the market for a 30-hp. boiler and shafting.

The Sheboygan Auto & Supply Company, Sheboygan, Wis., will build a two-story addition, 30 x 60 ft., early next year.

Solon Knickerbocker, Dodgeville, Wis., has purchased a site for a garage to be erected next spring at a cost of about \$7500.

The electric power plant of the Glidden Mfg. Company, Glidden, Wis., was destroyed by fire last week with a loss of \$30,000. No decision as to reconstruction will be made at present.

Articles of incorporation have been filed by the E. Wege Concrete Machinery Company, LaCrosse, Wis., with a capital stock of \$25,000 by E. F. Wege, J. P. Christell, George H. Gordon, attorney, and others.

The Burnox Company, West Allis, Wis., has been organized to do general manufacturing and repairing by Theodore Mueller, Paul Hunt and Charles E. Kubicek. A plant has been provided and operations begin at once.

J. Hamachecke & Sons, Two Rivers, Wis., are preparing plans for a machine shop and garage. Plans provide for a two-story building of reinforced concrete, 60 x 125 ft.

The Milwaukee Steel Foundry Company, 157 Virginia street, Milwaukee, Wis., is building an addition to its plant.

St. Louis

ST. LOUIS, Mo., October 26, 1914.

Business in machine tools continues dull, though a steadily improving feeling and a slight increase in actual business is noted. Such little buying as has been done has been to meet imperative wants in replacement, as a result of accident, etc. No buying of consequence is reported at any point.

A manufacturing plant, working through the Holdrook-Blackwelder Real Estate Company, St. Louis, has acquired a four-acre site on Union avenue and will erect a plant to replace its present quarters.

The More Automobile Company, St. Louis, has been incorporated with a capital stock of \$15,000 by Edward A. More, J. B. Stauch and J. T. Salisbury and will equip a garage.

The McKinney Traction Cultivator Company, St. Louis, is building a two-story plow factory and is reported in the market for additional equipment.

The Security Stove Mfg. Company, Kansas City, Mo., has increased its capital stock from \$80,000 to \$110,000 and will add to its manufacturing facilities.

The Bauch Mill & Elevator Company, Cabool, Mo., A. R. Beckett in charge, will install equipment for generating electricity for public service and also an ice plant of about 25 tons capacity.

W. H. Watson, Kirksville, Mo., will erect a blacksmithing and machine shop.

The Chaffee Ice & Cold Storage Company, Chaffee, Mo., will equip a cold storage and ice-making plant, etc. Miller & Sons, Chaffee, are the engineers.

The commissioners of the electric light and waterworks plant, Bentonville, Ark., are in the market for one 75-kw. two-phase generator, etc.

The Brinkley Light & Water Company, Brinkley, Ark., will install one 100-kw. generator, three-phase, 60 cycle, 2300 volts, etc.

Mangum, Okla., has voted \$100,000 of bonds for the equipment of electric light, waterworks and ice-making plants. The mayor should be addressed.

B. D. Griggs, Carter, Okla., will equip a flour and feed mill and also an electric light plant to cost about \$8000.

An ice plant will be equipped by J. R. Smith, Morris, Okla.

The Choctaw Lumber Company, Bismarck, Okla., will rebuild its lumber mill recently destroyed by fire with a loss of \$20,000.

The Majestic Mfg. & Vending Company, Tulsa, Okla., has been incorporated with a capital stock of \$10,000 by J. and E. T. Egan and J. B. Dickinson to manufacture vending machines.

Oklahoma City, Okla., will expend about \$250,000 extending its waterworks, etc.

The Oklahoma State Board of Prison Control, of which A. K. McAlester is chairman, will equip a chair factory at the state penitentiary, McAlester.

The lumber mill of Fullerton & Stewart, Okmulgee, Okla., is reported burned with a loss of about \$20,000. It will be replaced at once.

The Boardman Company, Carl F. Welhener, president, Oklahoma City, Okla., manufacturer of steel tanks, bridges and road building machinery, has acquired the plant of the Imperial Iron Works, to take care of the expansion in the former company's business.

The Mackey Rotary Engine Company, Boley, Okla., has

been incorporated with a capital of \$10,000 by J. S. Manning, T. C. Jacobs and E. L. Arrington.

The Meridian Car Shops, Meridian, Miss., are in process of construction at a cost of \$15,000, and are to be equipped with machinery for the general repair of railroad cars.

The ginnery of the Pooleville Gin Company, Pooleville, Okla., has been burned with a loss of \$7000.

W. P. Holland, of the Planters Mfg. Company, Clarkdale, Miss., is reported in the market for elevator equipment and other mill machinery.

W. H. Allen, Belzoni, Miss., has plans for the equipment of a flour mill of 50 bbl. daily capacity, etc.

Cheatham & Son, Columbus, Miss., are in the market for milling and elevating machinery for a mill of 50 bbl. daily capacity.

The Iuka Lumber Company, Iuka, Miss., will re-equip its saw mill recently burned, with a loss of about \$10,000.

The Futvoye-Paterson Company, Shuqualak, Miss., of which W. C. Futvoye and N. C. Paterson are stockholders, will equip a lumber mill.

A lumber plant will be operated at Hazlehurst, Miss., by J. D. Flanagan, Grand Rapids, Mich., and others.

The Board of Control of the Louisiana Lepers' Home, of which J. J. Powell, New Orleans, La., is president, will equip an electric power plant, a waterworks including pumps, etc. Bids will be received until November 10.

Melville, La., will receive new bids until November 3 for its electric light plant, to cost about \$15,000, the first bids having been rejected. W. L. Thompson, Boyce, La., is the engineer in charge.

West Monroe, La., will equip an electric light plant and increase its waterworks plant capacity, receiving bids until November 14. N. G. Tippitt is mayor.

The Central South

LOUISVILLE, Ky., October 27, 1914.

Although industrial activity in this section is at a low level at present, prospects with machinery concerns have been improved by the fact that many municipalities are planning to make extensive improvements. Most of these depend on bond issues which are to be voted on November 3, and it is hoped that the final months of the year will receive stimulation from the placing of orders for electric light and waterworks equipment. Most of the business being booked just now consists of small orders. Inquiries are less numerous than usual, but in spite of adverse conditions most of the machinery plants are managing to run close to full time.

The Carnett Brothers Sulky Plow Company, Wartrace, Tenn., plans to erect a plant for the manufacture of a patented plow. A fireproof building, 65 x 300 ft., will be erected, and machinery costing \$60,000 will be installed. Bids on the equipment will be received December 12. The machinery will include a 360-hp. boiler, engine, transmission equipment and a large amount of metal-working machinery. R. J. Carnett, the secretary, should be addressed.

The Illinois Central Railroad Company, 135 East Eleventh place, Chicago, will build a machine shop, turntable and round-house at Dyersburg, Tenn. A. S. Baldwin is chief engineer.

A steam heating plant will be installed by the Hope Rescue Mission, Eighth and Jefferson streets, Louisville. William H. Montgomery, Louisville, is the architect.

The Beecher-Fowler Mfg. Company, 140 South Third street, Louisville, has taken over the Arthur Jones Foundry Company, and will enlarge its business. It is in the market for a milling machine, lathe and power saw. C. E. Beecher may be addressed.

The Kentucky Revivo Battery Company, Louisville, has been incorporated with \$200,000 capital stock, and will manufacture a patented electrical device. Details will be announced shortly. Harry W. Embry is one of the principals.

The Modern Woodworking Company, Louisville, which will equip a plant to make bakers' supplies and other wood specialties, is now ready to buy its machinery. Frank Hillerich, 539 Garden street, should be addressed.

Brinton B. Davis, a Louisville architect, is in charge of plans for a hotel for Danville, Ky., which will be equipped with high pressure boilers, elevators, etc.

The machine shop of Logan Pedigo, Glasgow, Ky., which was destroyed by fire October 21, will be replaced and new equipment purchased.

The Pond Run Sand & Gravel Company, Ashland, Ky., is equipping a sand-handling plant, and is in the market for a 50-hp. gas engine, a rolling screen elevator, shafting and conveyors. Address J. R. Simpson, the president.

W. T. Sistrunk & Co., Lexington, Ky., plan the estab-

lishment of a cold storage plant at Mill and Vine streets, with 20,000 sq. ft. of floor space. Automatic refrigerating equipment will be installed.

The New Century Iron & Steel Works, 821 Chestnut street, St. Louis, is planning to locate a plant in Covington, Ky., or some other Kentucky point on the Ohio River. Thomas R. Pullis is in charge.

The Low Ash Mining Company, Middlesboro, Ky., is planning to open a mine, which will be equipped with electrically operated cutting and haulage equipment.

George Greenup and L. J. Metcalfe, Stithton, Ky., are purchasing equipment for an electric light plant. The estimated cost of the machinery is \$2500.

Irvine, Ky., has sold an electric light franchise to C. R. Flynn, who plans to establish a plant.

The Broadhead Garrett Lumber Company, Winchester, Ky., plans the erection of a sawmill.

The Clinchfield Ice & Coal Company, Johnson City, Tenn., has been incorporated with a capital stock of \$30,000 by W. W. Romine, J. W. Franklin and W. M. Brown.

Ward's Garage, Johnson City, Tenn., has been established with \$5000 capital stock by O. P. Ward, Charles D. Vance, Charles Bayless, and others.

Kennedy Bros., Monteagle, Tenn., are reported to have plans for the installation of an additional ice machine.

The plant of the Centerville Ice Company, Centerville, Tenn., was recently burned with a loss of \$5000. Rebuilding plans are now being considered by the owner, Levy Malugin.

The Satin Glass Process Company, Chattanooga, Tenn., will establish a plant for the manufacture of glassware. The company has been incorporated with \$25,000 capital stock by K. R. Evatt, S. L. Miller, and others.

P. R. McCrary, 21 Baldwin street, Chattanooga, Tenn., has patented an ice manufacturing machine and plans to establish a plant for its manufacture.

The triple band mill of the Honaker Lumber Company, Honaker, Va., which burned with a loss estimated at \$250,000, will be rebuilt. A. P. Perley is manager.

Birmingham

BIRMINGHAM, ALA., October 26, 1914.

Machinery dealers continue to report business at a minimum with no early revival expected. "As for the sawmill trade," said an experienced dealer, "a man purchasing sawmill machinery now would be looked on with suspicion." One large Alabama plant has shut down. Pumps and engines for agricultural purposes are reported as the most active articles in the trade. A fair demand for machine tools comes from the mines and those engaged in structural operations.

The Florida Citrus Supply Company, 230 West Bay street, Jacksonville, Fla., has been incorporated with a capital stock of \$100,000 by E. N. and J. L. Maull and R. R. Barringer, and has taken over the business of Edward N. Maull, manufacturer of citrus packing house machinery and irrigation plants, and dealer in similar supplies. It will be in the market for transmission appurtenances, rubber and cotton belting, canvas duck, lag screws, etc.; iron, steel and wood pulleys, detachable malleable chain and fittings, sprockets, hangers, shafting, blowers, plain iron and shapes, etc. The company has a thoroughly equipped factory. E. N. Maull is president and R. R. Barringer is secretary.

J. H. St. Claire, Greenfield, Ala., will rebuild his recently burned sawmill and ginnery.

W. H. Phillips & Son, Yantley, Ala., will rebuild their sawmill burned with a loss of \$6000.

The City Ice Delivery Company, Mobile, Ala., will build a plant costing \$50,000, using crude oil as fuel.

The American Tar Products Company, of which Samuel H. Bingham, Chicago, Ill., is president, has let the contract for building a plant to utilize the tar product of the Koppers by-product ovens of the Woodward Iron Company, near Birmingham.

The International Asphalt Company, Prichard, Ala., will rebuild its plant recently damaged by fire to the extent of \$10,000.

The Tuskegee Normal and Industrial Institute, Tuskegee, Ala., of which Booker T. Washington is president, is proceeding with improvements consisting of a central heating and lighting plant, ice and cold storage plants, power plant, steam distribution and water supply, etc., at a total cost of \$274,000. The Lord Construction Company, New York, is in charge of construction and Walter Franz, Union Trust Building, Cincinnati, is consulting engineer.

Manchester, Ga., has had plans prepared by J. N. Hazle-

hurst & Sons, Atlanta, for a waterworks and sewerage system to cost \$40,000.

Donaldsonville, Ga., has voted \$10,000 of bonds for the establishment of a cold storage and ice-making plant.

The Atlanta Mfg. & Investment Company, Atlanta, Ga., has been incorporated with a capital stock of \$10,000 and an authorized capital of \$100,000, to manufacture sample cases, trunks, etc. M. H. Davies, W. O. Foote and W. G. McKenzie are the incorporators.

The Homestead Light, Ice & Power Company, Homestead, Fla., will establish an ice and electric lighting plant at a cost of \$16,000.

Lakeland, Fla., has voted \$130,000 of water and light plant improvement bonds. O. M. Eaton is mayor.

Waterboro, S. C., has voted \$15,000 of electric light system bonds. D. B. Black is city clerk.

Texas

AUSTIN, TEXAS, October 24, 1914.

The machinery and tool trade continues sluggish, although considerable demand for equipment for manufacturing concerns is reported. Preparations are also being made in semi-arid sections for a large amount of irrigation development, which will require pumping machinery.

Lon J. Geer, Gainesville, and associates, plan to construct a cotton mill to cost about \$300,000.

The Anahuac Canal Company, which has been organized at Galveston with a capital stock of \$100,000, will construct an irrigation canal in the Anahuac district. Dredging machinery will be required. Thomas J. Ellis is one of the incorporators.

The J. M. Abbott Company, Beaumont, has been organized to construct an oil pipe line.

The Houston-Lichnovsky Gin Company will construct a cotton gin at Floresville. S. V. Houston is one of the principals.

William F. Lemke and Jose Castellot, City of Mexico, are preparing to construct an irrigation system in the territory of Tepic, Mexico. They hold a concession from the Mexican federal government for the project. A pumping plant will be installed on the Acaponeta River.

The Ft. Worth Crushed Stone Company, recently organized at Ft. Worth with a capital stock of \$50,000, will require considerable machinery. J. T. Hughes, C. K. Bardin and H. E. Cummings are the incorporators.

The Walnut Springs Ice & Cold Storage Company, Walnut Springs, will construct an ice factory and cold storage plant. J. R. Carlton is one of the owners.

Land owners of Victoria County have taken steps to form a new drainage district that will embrace about 70,000 acres of land. Bonds will be issued for the improvement. Dredging equipment will be required.

The Texas Metal Bed Company, Houston, is equipping its new factory with machinery to turn out about 150 beds a day.

William Polatsik, 43 Front street, New York, and associates, have purchased 500 acres of land near Burnet where machinery will be erected to work a deposit for Ichthyol.

The Pacific Northwest

SEATTLE, WASH., October 20, 1914.

The machinery and tool markets continue rather quiet. There has been some demand for electrical machinery, especially in Alaska, where several large projects are under way. While the lumber market shows little improvement, several large firms are erecting mills and shingle plants in Washington and Oregon, and a number of mills which recently burned are now being rebuilt. Local machinery men have profited by these improvements, and have received the bulk of the business. Crops are moving well, and the "buy-a-box-of-apples" movement has done much to assist the fruit growers in eastern Washington to dispose of their unusually large crops.

Terry & Harris, Yeon Building, Portland, are having plans prepared for the construction of a plant for the manufacture of cast-iron water and gas pipe and fittings. The plant will cost about \$100,000, and bids will be asked for soon.

Cathlamet, Wash., recently voted a bond issue of \$4200 for the construction of a municipal electric lighting and power plant.

The Stanley Smith Lumber Company, Hood River, Ore., will soon begin work on rebuilding its burned sawmill. The new plant is estimated to cost \$65,000.

J. L. Keeler, Sequim, Wash., has been granted a franchise by the City Council for furnishing the city with light and power. Construction work will begin at once.

Square Butte, Mont., has sold a bond issue to cover the cost of a waterworks system, and it is stated construction will be started immediately.

The Chamber of Commerce, Seattle, announces that A. Henegan, 2309 Madison street, Seattle, will erect a poultry and stock food factory to cost about \$65,000.

G. W. Morrow, Lewistown, Mont., general land and town-site agent for the Chicago, Milwaukee & St. Paul Railroad, has announced that plans are under way for electric light plants at Highwood, Denton, Roy, Winnifred and Winnett, and other towns along its line.

The Peck Milling & Electric Company, Peck, Idaho, has been incorporated by Turner & Lantzy, and others. It plans to build an electric light plant and a flour mill, at a cost of \$55,000. A turbine waterwheel will be used to generate power.

Seattle, Wash., has withdrawn the award of the contract for its proposed apple cold storage warehouse and rejected all bids submitted. The Port Commission has decided that the warehouse will not be equipped with refrigerating machinery at this time. It will be used as a general warehouse only, and cold storage facilities will be installed at a later date. The new plans provide for a warehouse, fish cold storage structure, fish refrigerating machinery and ice-making plant. Bids for the fish cold storage plant will call for a complete plant. Acting chief engineer J. R. West has been instructed to prepare specifications covering the new changes, and bids will be called for in about six weeks.

The Puget Sound Mills & Timber Company, Port Angeles, Wash., is having plans prepared for a box factory, to cost \$40,000.

The Willamette Pulp & Paper Company, Oregon City, Ore., is having plans prepared for improvements and enlargements to its plant. Some additional machinery will be installed.

The mill of the La Conner Shingle Mill Company, Mt. Vernon, Wash., was completely destroyed by fire recently with a loss of about \$10,000. It was owned by J. Jacobsen. It will probably be rebuilt.

Western Canada

WINNIPEG, MAN., October 21, 1914.

The Farmers' Independent Grain Company, Ltd., Berchard, Sask., has been incorporated with a capital stock of \$20,000 to manufacture flour and feed.

The Oxford Bay Timber & Logging Company, Ltd., Vancouver, B. C., has been incorporated with a capital stock of \$175,000 to build sawmills.

The Gageweight Scale Truck Company, Ltd., Vancouver, B. C., has been incorporated with a capital stock of \$300,000.

The plant of the Alberta Linseed Milling Company, Medicine Hat, Alberta, was almost completely destroyed by fire with a loss of \$20,000.

The board of public works, Vancouver, B. C., has had plans prepared for the construction of a grain elevator of 1,500,000 bu. capacity.

The James Horrigan Company, Ltd., Port Arthur, Ont., has been incorporated with a capital stock of \$100,000 by James Horrigan, W. T. McEachren, A. J. McComber, and others, to manufacture wooden articles and to operate a sawmill.

The Newago Company, Ltd., Port Arthur, Ont., has been incorporated with a capital stock of \$200,000 by W. H. Russell, Hugh Keefer, E. Towers, and others, to operate lumber mills.

Eastern Canada

TORONTO, ONT., October 24, 1914.

The Bedford Mfg. Company, Bedford, Que., is rebuilding its factory recently destroyed by fire. It will also generate electric power for its factory.

The Canadian Vickers Company will construct a dry dock 156 x 382 ft. at Longue Pointe, Que., to cost \$165,000.

A by-law to authorize the erection of two factories for the Metal Products, Ltd., 341 DeGaspe avenue, Montreal, was defeated by the ratepayers at St. Jerome, Que. It is announced that the company will build elsewhere. Benoit & Gerard, Southam Building, Montreal, are the architects.

R. Neville's sash and door factory at 933 Wiseman avenue, Montreal, was completely destroyed by fire, with a loss of \$100,000.

Smith & Rutledge, Newmarket, Ont., are in the market for a portable 25-hp. engine, a portable 25-hp. boiler and a gas generator.

The Montreal Harbor Commissioners have decided to go ahead at once with the plans for extending No. 2 elevator, to cost \$800,000.

The contract has been awarded by the City Commissioners, Montreal, to E. Laurie & Co., 245 Bleury street, Montreal, agents for the DeLaval Turbine Company, Trenton, N. J., for furnishing and installing a low level pumping station, and a 24,000,000-gal. steam turbine-driven lift centrifugal pumping engine at a cost of \$47,775.

The Canadian Car & Foundry Company, Montreal, has a contract for the manufacture of 5000 shrapnel shells.

The Beaver Wood Fibre Company, Ltd., Thorold, Ont., has been incorporated with a capital stock of \$1,000,000 by Harold E. McKittrick, G. R. Kappele, Harry Riley, Toronto, and others, to acquire the plant of the Beaver Company, Thorold, Ont., and to manufacture pulp wood and paper.

The Central Casket Company, Ltd., Bridgeburg, Ont., has been incorporated with a capital stock of \$40,000 by M. Kimball, H. R. Morwood, C. A. Hamlin, and others, to manufacture undertakers' supplies.

The Chateauguay Electric & Mfg. Company, Ltd., Ste. Martine, Que., has been incorporated with a capital stock of \$145,000 by U. Archambault, J. A. Fournier, J. T. R. Gazeau, and others, to manufacture electrical goods.

The Crystal Cut Glass Company, Ltd., Ft. Erie, Ont., of which William L. Hunt is president, will build and equip a factory at Bertie and Rose streets.

The Stonemeal Fertilizer Company, Paterson, N. J., is completing plans for the erection of a fertilizer manufacturing plant to cost \$60,000 at Kingston, Ont.

Government Purchases

WASHINGTON, D. C., October 26, 1914.

The lighthouse inspector, Portland, Ore., will receive bids until 2 p. m., November 6, for furnishing oil engines and compressors for two lighthouse stations in the State of Washington.

Sealed proposals will be received by the lighthouse inspector, Tompkinsville, N. Y., until 2 p. m., November 10, for furnishing and delivering two Scotch type boilers for lighthouse tender Larkspur.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, November 24, schedule 7466, for one car-handling winch for Brooklyn; schedule 7467, two 2 1/4 x 3 3/4-in. automatic machines for bar work for Newport; schedule 7468, two 22 x 24-in. flat turret lathes for Norfolk; schedule 7469, one drilling machine and one single gear power press, both for Washington; schedule 7470, one motor-driven flask-boring outfit for second roughing and one automatic machine for finishing propeller blades, both for Newport; schedule 7496, three 4-jawed reversible steel chucks and one double-acting triplex vertical pump, all for Washington; schedule 7497, three steel derricks for Philadelphia; until December 1, schedule 7473, two condensers, one of 1000 sq. ft. surface and one of 350 sq. ft. surface with air and circulating pump and accessories, and schedule 7474, three complete centrifugal water system pumps, all for Mare Island.

Bids were received at the Bureau of Supplies and Accounts, Navy Department, Washington, October 20, for furnishing supplies to the Navy Yard as follows:

Schedule 7357, Steam Engineering

Class 41, Annapolis—One triple combination shearing machine—Bid 102, \$1452.50; 116, \$2113; 154, \$2055; 166, \$2750; 189, \$2120; 206, \$1379 and \$2142.

Class 42, Annapolis—One set flanging clamps—Bid 30, \$390 and \$470; 87, \$310; 116, \$400; 129, \$295; 142, \$325; 166, \$275; 189, \$350; 214, \$299.

Schedule 7358, Steam Engineering

Class 43, Pier 67, New York—Three electric hoists for radio station, Darien, C. Z.—Bid 4, \$1275; 49, \$1050; 51, \$1124; 84, \$1358; 101, \$1400; 111, \$1345; 122, \$1394.80; 124, \$1444 and \$1584; 131, \$1520, \$1642, \$1520 and \$1642; 139, \$1352; 145, \$1200, \$1162, \$1150, \$600 and \$650; 156, \$1025; 197, \$2750 and \$2440.

The names of the bidders and the numbers under which they are designated in the above list, are as follows:

4, American Engineering Company; 30, F. A. Branda & Co.; 49, Thomas Carlin's Sons Company; 83, Hoisting Machinery Company; 84, Hyde Windlass Company; 87, Hiles & Jones Company; 101, Nelson Kent; 102, Kemp Machinery Company; 111, Lidgewood Mfg. Company; 116, Manning, Maxwell & Moore; 122, Maine Electric Company; 126, Meade, Morrison Mfg. Company; 129, D. Nast Machinery Company; 131, McMyler Interstate Company; 139, Minneapolis Steel & Machinery Company; 142, Niles-Bement-Pond Company; 145, National Hoisting Engine Company; 154, Prentiss Tid & Supply Company; 156, Pawling & Harnischfeger Company; 166, Joseph T. Ryerson & Son; 189, Scully Steel & Iron Company; 197, Thomas Elevator Company; 206, Weiner Machinery Company; 214, Wicks Brothers.

